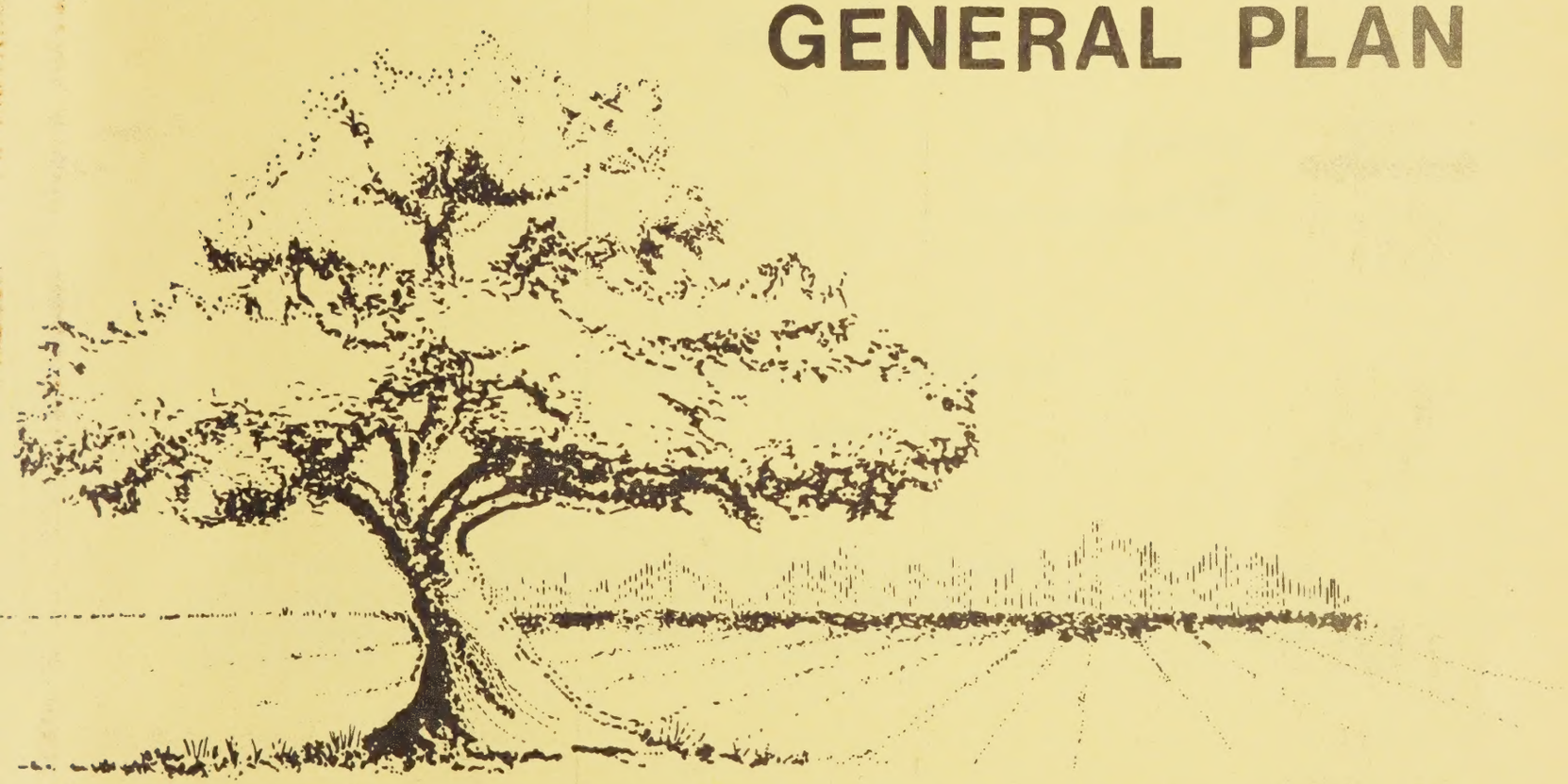
CONSERVATION ELEMENT

of The RIDGECREST GENERAL PLAN



Kern County, California

CE 8

DECEMBER 1973

CONSERVATION

AN ELEMENT OF THE

CITY OF RIDGECREST

GENERAL PLAN

City planning Ridgecrest
Conservation

Ridgecrest, California

1973

Prepared by the Ridgecrest Citizens' Advisory Committee on Conservation in Cooperation with the Kern County Council of Government - KERNCOG - and the Ridgecrest Planning Commission and Staff.

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ABSTRACT

TITLE:	Conservation Element of the City of Ridgecrest General Plan
AUTHOR:	Citizen's Advisory Committee in cooperation with Kern COG and the City of Ridgecrest Planning Commission and Staff.
SUBJECT:	Plan for conservation development and utilization of natural resources.
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ABSTRACT: This report is concerned with the conservation, development, and utilization of natural resources. It includes plans for water, hydraulic forces of water, flora, soils, rivers and other waters, fisheries, wildlife, minerals and other natural resources. The sections dealing with water were developed in coordination with the Indian Wells Valley County Water District and all district agencies which have developed, served, controlled or conserved water for any purpose.

The plan identifies general goals and policies, and outlines a course of action for implementing the plan.

This element was adopted by the Planning Commission on July 2, 1973.

Resolution No. 73-79.

This element was adopted by the City Council on December 18, 1973.

Resolution No. 552.

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INTRODUCTION

This state has demonstrated an unparalleled capacity to build and develop the economic resources needed to provide its citizens with a high standard of living. However, it is becoming increasingly obvious that a greater organized effort must be directed toward protecting and enhancing the natural resources and environment. To accomplish this end, this conservation element is included in the various elements of the General Plan adopted by the City.

Conservation is concerned with the management, protection, utilization, and improvement of the land. This element of the General Plan is developed to call attention to and assist in decision making which is necessary for long range comprehensive land use planning. Such planning must reflect realistic consideration of diverse factors such as soil, water, climate, population, transportation, taxation, and economics.

CONSERVATION DEFINED

CONSERVATION, as used in this element of the general plan is defined as:

> The official care, development, preservation, and utilization of such resources as water, soils, rivers and other waters, fisheries, wildlife, flora, minerals, and other natural resources.

That portion of the conservation element directed toward waters was developed in cooperation with the countywide water agency and with all district and City agencies which have developed, served, controlled, or conserved water for any purposes for which the plan is prepared.

The State Law provides that conservation elements may cover such additional features as:

1. The reclamation of land and water.

2. Flood control.

3. Prevention and control of the pollution of streams and other waters.

4. Regulation of the use of land in stream channels and other areas required for the accomplishment of the conservation plan.

5. Prevention, control, and correction of the erosion of soils, beaches and shores.

6. Protection of water sheds.

7. The location, quantity, and quality of the rock,sand, and gravel resources.

The City residents have a vested interest in the county area which effects the quality of their lives. Besides the general interest, a major sphere of interest exists in the area surrounding the City. For this reason, the City herein adopts goals and policy statements regarding such natural resources as forests and fisheries, which are not found within the City. Cooperation between the City, County and State planners is encouraged so the interests of all citizens can be protected.

GOALS
General

The following are declared to be the goals regarding conservation:

1. Develop and maintain a series of land conservation policies, including standards and criteria which can serve as guides to the planning efforts. These policies are developed in order to accomodate conservation, development and utilization of natural resources consistent with the production and wise management of our natural resources.

2. Fulfill the responsibilities of each generation as trustee of natural resources for succeeding generations.

3. Assure for all citizens safe, healthful, productive, and esthetically and culturally pleasing surroundings.

4. Attain the widest range of beneficial uses of the natural resources without degradation, risk to health or safety, or other undesirable and unintended consequences.

5. Preserve important historical, cultural and natural aspects of our heritage and maintain, wherever possible, an environment which supports diversity and variety of individual choice.

6. Achieve a balance between population and natural resource use which will permit reasonable standards of living and a wide sharing of life's amenities.

7. Enhance the quality of and maintain the quantity of renewable resources and approach the maximum attainable recycling of depletable resources.

GOALS OF THE PEOPLE OF THE CITY OF RIDGECREST

The Citizen's Advisory Committee questioned residents to determine what qualities of the Indian Wells Valley they found to be most valuable to them. The following statements represent their answers:

We have clear, clean air.
We have an abundance of open space.
we are surrounded by scenic mountain views which can be seen at all times of the year.
We have a sunny, dry climate and are within a reasonable distance from every climate from coastal to mountaintop.
Our recreation potential is enoromous.
Much of our Valley is still comparatively natural.

The goal of this plan is to preserve these aforementioned qualities.

The Department of the Navy decided to develop a testing station in the Indian Wells Valley based on three major qualifications: good visibility, low population density and good transportation to Los Angeles. These needs should be met if the Department of the Navy is to do research and testing in this valley.

One important goal of the City of Ridgecrest should be to support a quality and style of life which are compatible with the area's prime employers.

Air pollution control must depend on the State and Federal governments except that the City shall not attempt to attract air pollution industries.

All elements of the General Plan must consider the fact that Ridgecrest and China Lake are here because this is a desert and that our continued existence depends upon maintaining clear air and an adequate water supply.

STATEMENT OF DEVELOPMENT POLICIES

While our resources must be shepherded more effectually in the future if we are to improve the quality of life for all citizens, care must be taken to insure that a balanced perspective is maintained. Traditional freedoms must be preserved and not subjected to unnecessary restrictions. A completely controlled economy, a totally planned and regimented environment, is as much of an anathema to the citizen as a completely unregulated and chaotic society. However, individual freedoms will have to be restricted in some cases to assure the maintainance of values for society as a whole. The purpose of these plans is to achieve a proper balance within the constitutional structure of government in a free society.

By developing appropriate conservation standards, our City will have a definite framework within which they may develop more specific goals and policies to meet their concern and responsibility.

Objectives

This plan was developed in order:

-- To provide the Planning Commission and the City Council with guidance to carry out the goals and policies "to protect, conserve, develop, and utilize the natural resources and wildlife of the State".

-- To preserve the rights of the people to the enjoyment of the environment.

-- To maintain areas of natural beauty and make them available for enjoyment by the people.

-- To propagate and protect fish and game.

-- To maintain and improve wildlife habitat.

-- To acquire and improve land for purposes of recreation.

Principles

This plan was prepared in consideration of the following basic principles:

1. Decisions on environmental problems should be made:

   a. At the level of government which is closest and most responsive to the people who are most affected by

the use of development of the particular natural resource.

b. State and Federal Government should intercede in local matters only where necessary to mediate jurisdictional disputes or where conservational problems and/or resources are of such a magnitude or unique quality that their significance extends beyond local jurisdictional boundaries.

2. State and Federal Government should assist local government in carrying out its responsibilities by providing technical and financial assistance to local government in protecting and conserving natural resources and the assessment of the impact of technology on the environment.

3. Local government should insure public participation in government's decision - making process by holding public hearings and providing an equal opportunity for all opinions to be presented and thoroughly considered.

CONSERVATION RESOURCES

1. WATER (General)

The only important source of water in Ridgecrest is ground water occurring in aquifers and extracted by pumping wells.

Ground water is an important resource and utlization and management are being studied. The ground water reservoirs are extensive, but they are neither infinite nor impervious to contamination.

In terms of general theory, it is possible to estimate natural recharge rates, discharge rates of underground reservoirs and to determine potentials for artificial recharge. Imported water or stream water, allowed to percolate or be pumped into an underground aquifer, could be used in the artificial recharging process.

The chemical and biological properties of the water can be determined, as well as the susceptibility of the reservoir to contamination from such things as effluent from sewer systems, pollution from discharge of industrial waste, or invasion by salt water. When these capabilities have been established and the three dimensional transmissability of the reservoir has been established, then it is possible to design and establish a program of ground water reservoir management that will provide optimal use of the resource.

Goal

1. To insure a supply and quality of water to meet the present and future needs of the Indian Wells Valley.

Policy

1. Dispose of solid and liquid wastes in a manner that prevents the contamination of fresh water.

2. Analyze and evaluate all proposals for utilization of water and waste water systems in terms of the cause and effect relationship of the activities proposed on the natural resource elements of the total environment.

Implementation

1. California has in the Porter-Cologne Water Quality Control Act the water quality standards which will be adhered to and enforced in order to provide an effective water pollution control measure. (More specifically, the Valley is included in the Lahontan Region under the State Resources Control Basin Plan).

2. The water supply of the City shall continue to be produced in a manner that provides adequate quantities and quality of water through cooperation with other water users and suppliers in the Valley.

3. The City shall work with the water suppliers if water is needed to enhance the recreation potential.

WATER

1. INVENTORY

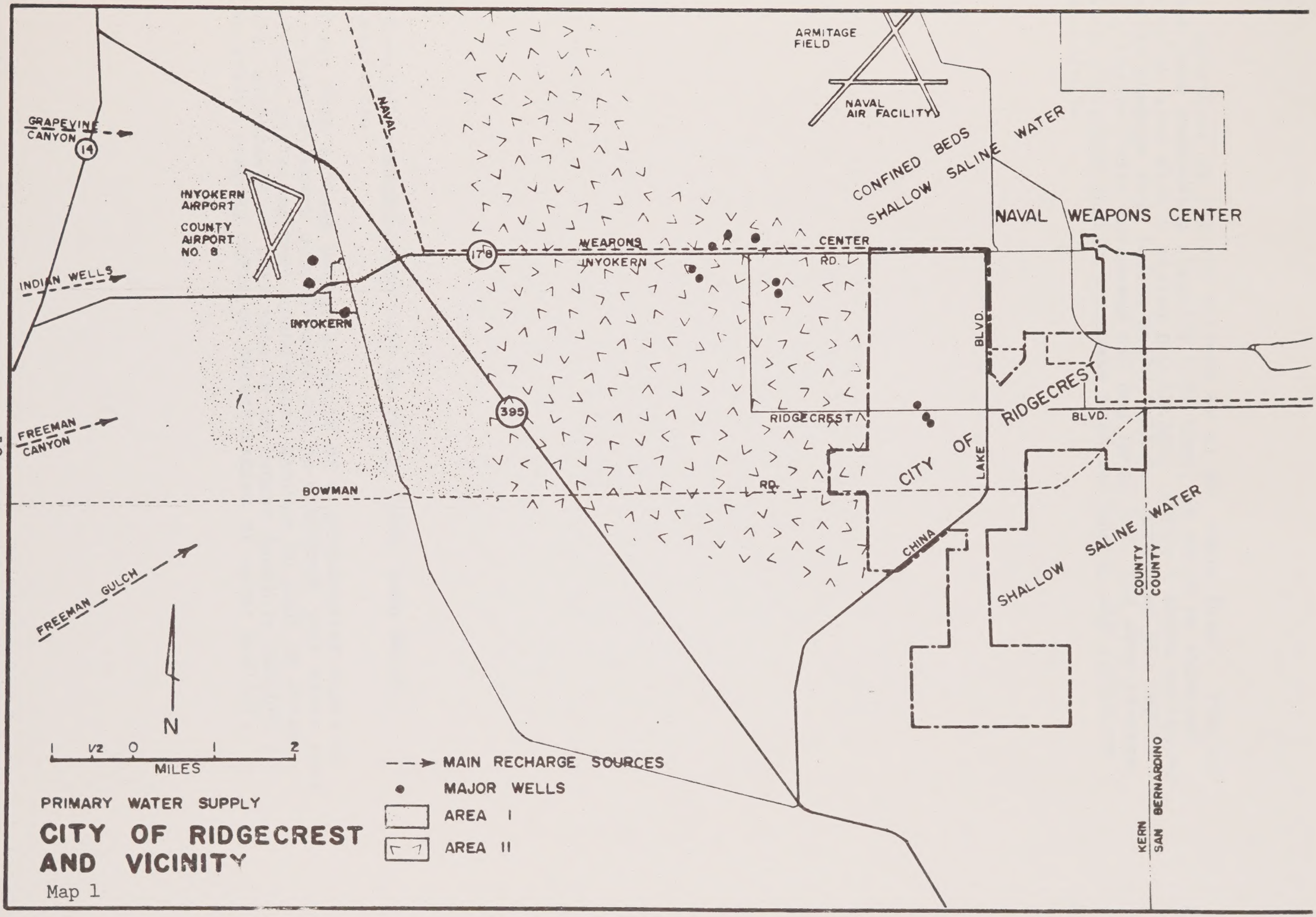
A. GENERAL COMMENTS

Indian Wells Valley is a closed desert valley with a limited amount of rainfall. The Valley is completely dependent upon underground water which is supplied primarily by the run-off from the Sierra Nevada to the west with a smaller amount available from rain which falls on the El Paso Mountains to the southwest. The other ranges surrounding the Valley receive limited rainfall and add little to the total, particularly since they tend to drain into the north and northeast sections of the Valley where salt content is high and water is unusable for many purposes. The main water body lies in the central part of the Valley. (See map 1.) Water quality in the eastern part of the Valley is poor due to high mineral content.

Hydrological studies have been conducted in the Valley since the early 1850's. Some work was done in 1912 by Lee, 1921 by Whistler and 1920 by Thompson. A comprehensive study was begun by the Water Resources Division of the United States Geological Survey in 1953 in cooperation with the Naval Weapons Center to determine available reserves and annual discharge and recharge rates. In 1969 this work was updated and published as "Geology and Ground Water in Indian Wells Valley" by Kunkel and Chase, USGS, Menlo Park, California.

The four main water suppliers in the Valley, Naval Weapons Center, Indian Wells Valley County Water District, Kerr-McGee Corporation and Stauffer Chemical Company have formed an informal water suppliers group to investigate the water supply. They have funded three other studies in order to monitor basin water qualtiy and quantity. These four studies form the basis of the following summary:

Based on data gathered from most of the wells in the Valley, test holes, rainfall and various geological assumptions, the USGS (1969) estimates the main water body in the Valley to contain a minimum of 720,000 acre-feet. This quantity was based upon a zone 100 feet down from the 1954 water table. This figure has been updated to 2,200,000 acre-feet in the 200 feet below the 1954 water table in an in-press USGS report "Geologic and Hydrologic Features of the Indian Wells Valley, California", L. Dutcher and W. Moylas.* The water bearing zone can vary from nonexistent to at least 1000 feet in the south central area. Most wells in the Valley are less than 400 feet deep; but at least six are 800 feet deep. The USGS has estimated the perennial yield** of water as 12,000 acre-feet per year



PRIMARY WATER SUPPLY

CITY OF RIDGECREST AND VICINITY

Map 1

(1 acre-foot is 348,480 gallons or 43,560 cubic feet). Pumpage has been increasing steadily with time, as would be expected from an area with a rising population. Table 1 shows estimated water pumpage from Indian Wells Valley. Water use per capita has historically increased but may level off, and even reverse, with increased public awareness that our energy and resources are finite.

*Personal communication with S. Filey, USGS, Long Beach, California.

**The USGS defines perennial yield of a ground-water basin as the rate at which ground-water can be withdrawn year after year without depleting the ground-water storage to such an extent that withdrawal at this rate is no longer feasible because of increased pumping costs or deterioration of water quality.

TABLE 1
ESTIMATED WATER PUMPAGE
INDIAN WELLS VALLEY
(Acre-ft. per year)

YEAR	TOTAL OFF CENTER	NWC	TOTAL VALLEY WIDE
1946	2,076	931	3,007
47	2,134	1,735	3,869
48	2,042	2,186	4,228
49	2,002	2,801	4,803
1950	1,963	3,297	5,260
51	2,516	3,869	6,385
52	2,751	4,158	6,909
53	3,519	4,570	8,089
54	3,412	4,922	8,334
1955	3,651	5,260	8,911
56	3,707	5,600	9,307
57	3,405	5,920	9,325
58	3,595	5,800	9,395
59	3,842	6,150	9,992
1960	4,306	6,250	10,556
61	3,929	6,390	10,319
62	4,215	6,830	11,045
63	4,440	6,580	11,020
64	4,446	7,110	11,556
1965	4,638	6,930	11,568
66	5,174	7,234	12,408
67	5,070	7,230	12,300
68	5,512	7,518	13,030
69	5,707	7,768	13,475
1970	5,843	8,184	14,027
71	6,330	7,970	14,300
72	7,130	8,070	15,200

Based on historic data, the future Indian Wells Valley water demand has been projected. Two types of projection were used- a linear extrapolation and a damped exponential. The advantage to the linear (straight line) projection is that it is widely used and easily understood, while its chief disadvantage is that it is a functional form that never levels off. The advantage to the damped exponential is that it often corresponds more to real life by leveling off. The exponential is a better fit by 15%, it comes closer to the data points than the linear curve and it shows a future demand leveling off at about 30,000 acre-feet/year.

Although the projected values from the table are not reliable for greater than 20 years in the future, then can be used to get an estimate of how long the underground water resource may last and they illustrate that there is a finite amount of water available from known sources for use in this area. Three different future trends were projected linearly and exponentially. In addition, because of the uncertainty about the groundwater reserve, 4 different reservoirs were assumed. Using mathematical models to predict future use, the following table was created:

Lifetime of Groundwater Resources
(assuming usable quality of water)

If the Estimated Groundwater Reserve is	Then if we show no change from 1971-the water is adequate for
600,000 acre-feet	132 years
1,200,000 acre-feet	264 years
2,400,000 acre-feet	528 years
4,800,000 acre-feet	1056 years

If the Projected Use Grows
(and the estimated groundwater reserve is as above)

By the Best Fit Exponential Estimate then water is adequate for	By the Best Fit Linear Estimate then water is adequate for
53 years	43 years
87 years	65 years
146 years	96 years
255 years	140 years

One geologist in the Valley, Dr. Carl Austin, believes that there is considerably more water available than is indicated by the USGS midvalley underflow study by itself. Due to many

assumptions on water availability in the report (some of which are unavoidable when making a study of this kind) Dr. Austin says until further work is done to determine the total underflow within the Valley we cannot make a valid estimate. To use the midvalley underflow estimate of the USGS is certainly a very conservative way of achieving a number. He maintains this is only a portion of the underflow within the Valley. For instance, thermal upwelling along the western portion of the Valley could produce a significant supply. In particular, he feels a large quantity of water may be available in the Sierra block due to its fractured state in many places. Since this block is huge, a water content of even 1 or 2 percent could be the source of much additional water. The presence of water in mines from the Sierra would indicate this might be a possibility for further study by USGS.

Until further work is done to verify suggestions such as these, prudence would dictate accepting USGS estimates. It is better to base a water use program on a conservative pool than to assume a larger one and discover that the estimate was too optimistic.

B. INDIAN WELLS VALLEY COUNTY WATER DISTRICT

Prior to 1956, water in the Ridgecrest area was either privately pumped or supplied by several small privately-owned water systems. This arrangement caused so many problems that the majority of them finally merged in 1955 after a public election to form the Ridgecrest County Water District, a public entity with the authority to construct and maintain a community water service. In 1963, the City of Ridgecrest was incorporated and in the following year, the City attempted to include the Water District's functions as part of the City, reasoning that more economical use of facilities, transportation and personnel would result. In 1965 the City lost the suit and the Water District has remained an independent entity. It is now called the Indian Wells Valley County Water District. (See Map 3.)

The District has an elected board of five members who hire a general manager, secretary, engineer, lawyer and auditor.

Facilities include six wells, two in the Intermediate Area (midway between China Lake and Inyokern) with a combined capacity of 2000 gallons per minute (GPM). The others are located in Ridgecrest. These 300 foot wells have a combined capacity of 1700 GPM. The two 800 foot wells in the Intermediate Area have a potential of producing 4000 GPM as demand rises. Storage tanks with a combined capacity of 3,000,000 gallons are available in the District. (See Map 2.) The number of consumers in March, 1973 was 411 commercial and 2554 non-commercial. In 1971, total pumpage was 2050 acre-feet.

C. NAVAL WEAPONS CENTER

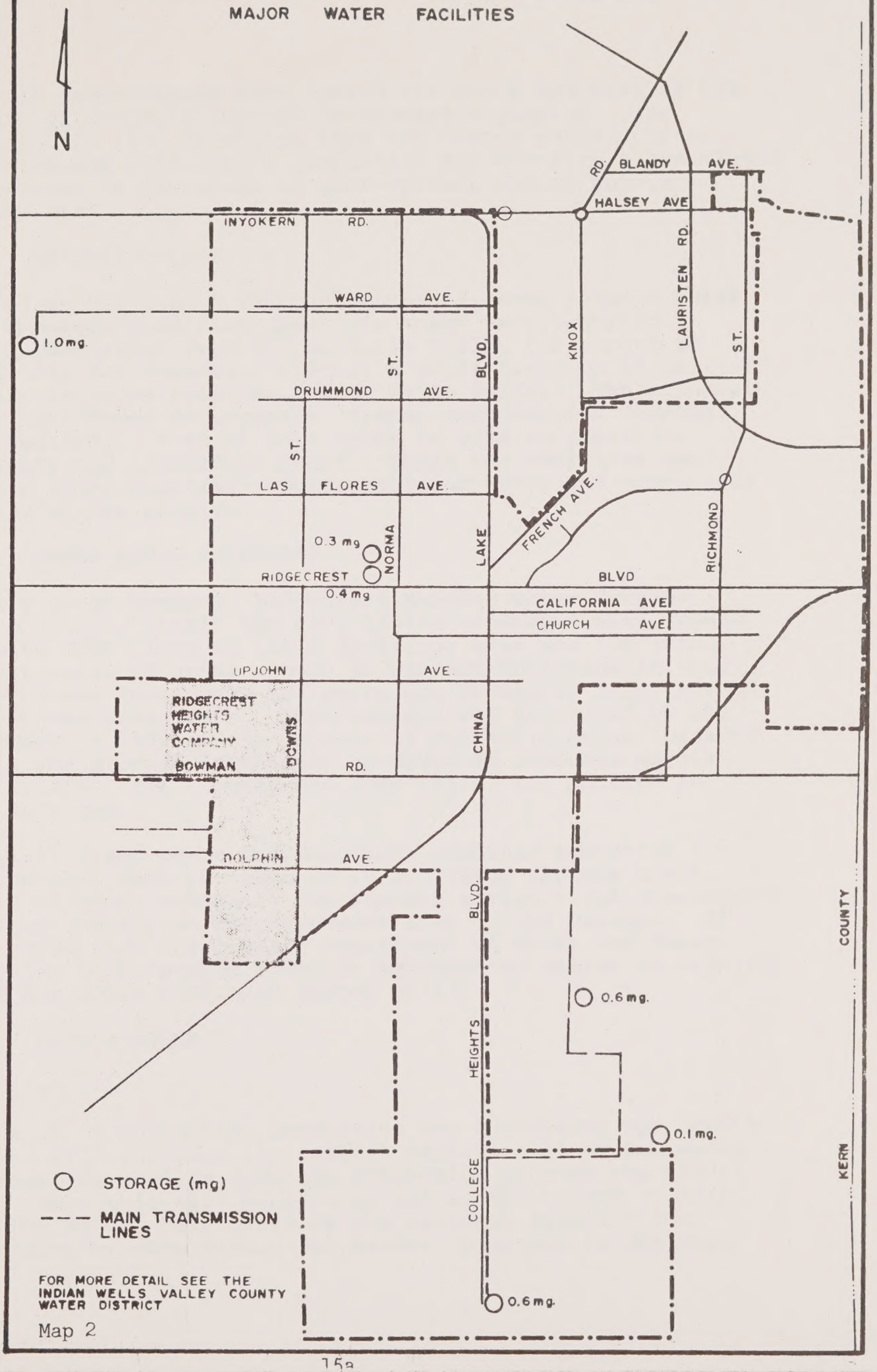
The Navy has been pumping water from the basin since 1955. Their pumpage has increased steadily since that time. In 1970, for the first time, pumpage was approximately the same as the previous year. In 1971 total pumpage by Naval Weapons Center was 7970 acre feet. As housing is removed, population slowly declines, and less irrigation of lawns and trees is required, water use should decline. The Naval Weapons Center currently uses over half the water pumped from the basin with only one third of the population. This high per capita use is caused in part by the need for irrigating the Center's extensive lawns, trees and gardens (34%) and water for "swamp coolers" (14%). Most of this water is lost to evaporation and/or seeps into nonrecoverable areas. The other 52% is split between domestic and industrial use. The Navy does not meter water; these figures are estimates provided by Naval Weapons Center personnel.

The Center has 7 main wells plus 8 small wells scattered throughout the west area for local uses. Four wells in the Inyokern area, near Harvey Field, vary in depth from 400 to 500 feet, each capable of pumping 1800-2000 GPM. A 1.5 million gallon (MG) reservoir is located here. Three wells in the Intermediate Area, all at 800 feet are capable of pumping 2000 GPM. Two 1.5 MG reservoirs are also located nearby. The other three wells and the five storage tanks are on Navy property. Three reservoirs for a total of 3.5 MG are located to the east of the housing areas. These serve to equalize pressure so that fewer pumps are needed during periods of peak water demands or fire fighting. Monthly demand varies from 100 million gallons in winter to 375 million gallons in summer. Peak demand in summer is approximately 15 million gallons per day.

The Center is actively studying the water situation through its cooperation in the water suppliers group. This group, which is sharing costs on a percent use basis, is currently funding three projects through the USGS. The first of these is a continuing investigation of the hydrology of the area with yearly reports on any changes of water level contours and water quality. The second project has resulted in a USGS paper, entitled "Mathematical Groundwater Model of Indian Wells Valley, California". This paper, based on data gathered in 1921 (prior to any intensive water use), develops a Valleywide Model of basin hydrology and tests the resultant predicitions of water level made from available well measurements taken during 1953 and 1968. After this model was adopted the 1983 water level contours were estimated. With this model, water level depths in various places can be predicted for the future; to the extent the model is accurate problem areas can be watched. The third report, still in progress, is a study completed last year, on the possible migration of brackish water from the eastern part

CITY OF RIDGECREST

MAJOR WATER FACILITIES



Map 2

of the basin around China Lake toward the south and west as the water table is actually lowered by excessive pumping. The report indicates that re-charge from the sewage ponds, China Lake watering and golf course irrigation are creating a beneficial natural barrier to migration of near-surface saline waters towards the west.

D. SEARLES VALLEY

Searles Valley has such a limited amount of known potable water that the chemical companies operating there have acquired land and pumped water from Indian Wells Valley for export to Searles Valley for decades. All but a small fraction of culinary water there is piped from the Indian Wells Valley. The principle users are Kerr-McGee Corporation (Trona) and Stauffer Chemical Company (Westend). Part of this water is sold to a private water company for individual users. These two companies are part of the water suppliers group mentioned above and contribute financially to the studies.

E. OTHER WATER SUPPLIERS

One private water company, Ridgecrest Heights Water Company, operates primarily within the City limits of Ridgecrest. There are close to 3000 lots in their marketing area and the water service potential is great enough to warrant inclusion in this study. Of these lots, only 327 users are currently being served, all on a non-metered basis. This company was purchased by the present owner in 1970 and the system is currently being upgraded. More wells and storage tanks will be added as finances permit and need arises. The company has four wells, all located in the area serviced.

All the small water users and suppliers combined accounted for about 1,200 acre feet per year in 1971. These include homes, small private water companies and limited agricultural consumption and a lumber company on the northwest side of the Valley. (It is to be noted that Los Angeles Department of Water and Power allowed water to be pumped from the aquaduct to assist in fighting a fire at the above mentioned lumber mill).

II DEFICIENCIES

A. General

A combination of increasing population and increasing per capita consumption will increase the rate of depletion of ground water and decrease the quality once the extraction exceeds the annual recharge. When this will happen can not be determined at this time because we can only estimate the recharge rate and the total culinary storage within our basin. Sometime in the near

future water conservation and management may be a necessity unless imported water is brought into the Valley.

B. INDIAN WELLS VALLEY COUNTY WATER DISTRICT

Due to increased population and consumption and recently expanded area services, the Water District is in the process of installing more storage facilities to take care of peak water demands and to ensure adequate water for fire fighting purposes. Current water supply capabilities are very close to maximum day demands. Recently completed storage tanks will provide a capacity of 3 million gallons.

The following table compares 1972 to estimated 1980 and 1990 water demands. The estimated figures are based on an average daily demand of 250 gallons per capita per day (gal/cap/day) (extrapolating from past trends) and the 1972 figures are based upon an actual consumption of 165 gal/cap/day.

TABLE 2 WATER DEMANDS - estimated for 1980 and 1990 (without Wherry Housing)

	1972	1980 (min. est.)	1980 (max. est.)	1990 (est.)
Population	10,500	12,500	14,000	20,000
Av. Day (GPM)	1,200	3,100	3,500	5,000
Max. Day (GPM)	3,000	7,750	8,750	12,500
Peak Hr. (GPM)	4,200	10,850	12,250	17,500
Fire Flow (GPM)	3,000	7,750	8,750	12,500
	for 10 hrs. 1.8 mg	for 10 hrs. 4.65 mg	for 10 hrs. 5.25 mg	for 10 hrs. 7.5 mg

PRESENT AND FUTURE WATER DEMANDS

As indicated, 165 gallons per day was the per capita use in 1972. With increased public awareness of energy and resource limits water use per capita might never reach the projected 250 gallons per capita per day. As people move from the Naval Weapons Center and have to pay for metered water, they might become more conservative with water use. This part of the report is based on the following design criteria specified by Boyle Engineering in 1972 Report on Water/Sewer Element and Program for Ridgecrest and China Lake.

1. Sufficient storage was provided to offset fire flow as required by National Bureau of Fire Underwriters. Demand storage to equalize hourly charges was provided and twenty-five percent of the total water requirement for the maximum day was used as minimum demand storage.

2. Water supply facilities to meet the above should be sufficient to meet maximum day demand plus replacement of fire flow in five days or the peak hours flow, whichever is greater, with the largest source out of service. Also an alternate source of power is desirable for the well(s) to meet the average day demand.

3. The water distribution system should carry the maximum day demand plus fire flow or the peak hour flow, whichever is greater. A minimum operating pressure of 20 psi at all delivery points at time of maximum demand is desirable.

4. The average daily demand is determined by multiplying population by 165 gal/cap/day for 1972 and by 250 gal/cap/day for later dates. The maximum day demand is determined by multiplying average day by 2.5 and peak hour, by multiplying the maximum day by 1.4.

TABLE 3 WATER SYSTEM REQUIREMENTS-PRESENT AND 1980
(1980 population at 14,000 demand at 250 gpcd)

	Present	1980
Fire Storage	1.8 mg	5.3 mg
Demand Storage	1.1 mg	3.1 mg
Total	2.8 mg	8.4 mg
Well Capacity (largest not in service)	3,260 gpm	5,720 gpm
Standby Power (well capacity)	1,200 gpm	2,170 gpm

If one of the large wells were shut down during a critical period, a large deficiency could arise. By 1980 this deficiency could reach 4,000 gpm. Water storage, when new storage is complete will be capable of taking care of peak demand storage but will not be adequate in case of major fire demands. By 1980 peak day demand storage will be deficient if additional storage is not provided. Maximum estimated population for 1980 would also indicate a need for more pump and storage capacity than the above estimates. Replacement of older lines and updating of the total system to meet the design criteria above are a necessity. Current rapid population increase (an average of about 40 new hookups per month from August 1972 to March 1973), the District expansion due to the inclusion of the Cerro Coso College area, and the construction of the four new storage tanks are putting heavy demands on the Water District.

The USGS investigations of water in the Valley indicate a

gradual lowering of the local water table and an increase in hardness of local water in shallow wells in the Ridgecrest area and a drop of water table in the intermediate areas due to excessive pumping. These levels will continue to drop and the water quality will deteriorate as the area increases its water demands.

C. NAVAL WEAPONS CENTER

Insufficient data was gathered to justify any statements.

III PROJECTED DEVELOPMENT PLAN

A. GENERAL

Naval Weapons Center and Indian Wells Valley County Water District indicate all parties in the water suppliers group were planning to continue their cooperation on study of Indian Wells Valley water and to continue their funding of the USGS studies. Both parties also reported that discussion of a formal water management plan for the Valley has been initiated.

Various additions or alternatives to Indian Wells Valley underground water supply have been suggested by local geologists. These sources include water from (1) the California Water Plan, (2) Los Angeles Department of Water and Power, (3) East Kern Plateau, (4) Mt. Olancha, and (5) geothermal sources. Water acquired from the Los Angeles Department of Water and Power Water Plan would be expensive as an aqueduct would be needed unless Deparment of Water and Power could be persuaded to give the Valley water in exchange for water from California Aqueduct. This route would have the potential of being cheapest as no major construction would be necessary, (the Navy formerly had a pipeline to the Department of Water and Power aqueduct, used when the Naval Weapons Center first came to the Valley).

The East Kern Plateau, which drains into the Kern River and ultimately into the San Joaquin Valley, could supply water to the Indian Wells Valley in exchange for California aqueduct water, by a diversion of the North Fork of the Kern River. It could be used directly or as a recharge source of water in the primary percolation zone. The Mt. Olancha drainage area has large water potential which is currently under-utilized and it is possible that water could be purchased from the area. Geothermal activity is a potential source of both water and energy. Two acres with considerable potential are within 30 miles of the Valley; these are Coso Hot Springs (on Naval Weapons Center land) to the north and in the Lava Mountains to the south.

B. INDIAN WELLS VALLEY COUNTY WATER DISTRICT

See map for a general plan for 1970-1975. Plans are being made to prepare another Master Plan for the District. This would include facilities to take care of a population increase of 50%. This plan should be good until 1980 and would include new storage, new pumps and new lines for both developing areas and for replacement of deteriorating lines. The District has a five acre plot five miles west of the Intermediate Pumping Area where they propose to develop a new well (at least 2,000 gpm) prior to the year 2000.

IV. OBSTACLES

A steadily expanding population places a burden on the water supply. The formation of a water management group would undoubtedly create a considerable amount of controversy and probably some legal problems.

Large scale development, be it agriculture, industry or subdivision, to the extent that the ground water storage will be depleted in a short time period, would be unwise.

V. CITIZENS' PARTICIPATION

A Valley-wide advisory committee with representatives from the general public as well as formal water suppliers could provide a beneficial input to the elected Water Board. This committee would be expected to be thoroughly familiar with the general water picture through attending meetings, reading literature on the subject and participating in discussions. Such a committee could be used as a sounding board and a source of information to the general public when major decisions, such as creation and implementation of a water management plan, adoption of conservation measures, or decisions on importing water into the Valley, must be made. The presence and effective functioning of such a group could prevent or at least alleviate intervalley conflict over the potentially explosive issue of the use of a vital natural resource.

VI FINANCING

Indian Wells Valley County Water District is financed primarily by water user's metered payments. In areas without water, developers must pay a $200/ acre fee for capital improvement, the first acre exempt. Water rates can be raised, if necessary, when operating funds are not sufficent to maintain existing facilities.

Financing at the Naval Weapons Center is from Federal tax money. The Naval Weapons Center determines water needs as part of their public works program and requests, each year, such money as they deem necessary.

The Ridgecrest Heights Water Company must pay for facilities out of the users fee. Since it is a private agency, no taxes could be imposed.

VII. TIME, SCHEDULE, PRIORITIES

A. INDIAN WELLS VALLEY COUNTY WATER DISTRICT

Current needs and deficiencies listed above indicate the following time schedule:

1973-74 by 1975	Complete storage and booster plans. Install transmission mains as required.
by 1980 or population of 14,000	Install another million gallons of storage and add a 4,000 gpm capacity well west of Ridgecrest
1985	1. Increase capacity as trends indicate. 2. Acquire more land in prime water area or make arrangements to buy from NWC wells, if excess water is available.

VIII. DEVELOPMENT

An expanding population places a burden in the form of increased services of every kind upon a city. In our City, the recent spurt of development, including shopping areas and subdivisions, is placing a great burden on the Water District facilities. In addition to this, it places a greater demand on the underground water supply.

IX. RELATIONSHIP OF WATERS TO OTHER PLANS AND ELEMENTS OF THE GENERAL PLAN

The water supply in the Valley is too limited to support large scale commercial agriculture. If such is ever undertaken outside sources of water must be made available.

Water is a crucial element when planning parks and other water using recreation facilities. Planning, development and maintenance should all be done on the basis of water availability, cost and conservation.

Water is crucial for life anywhere, but particularly for us on the desert. It affects every aspect of our lives and the continued existence of our City. No part of the General Plan should be implemented without a study of the effect on our water quantity and quality.

X. CONCLUSIONS AND RECOMMENDATIONS

1. The major suppliers group should continue to function in the best manner for all concerned.

2. The USGS report recommended a different placement of Wells (particularly the large ones) in the Valley. Current practice has confined the major pumpage to three areas and the concentrated removal of water lowering local water level contours in the Intermediate Area and Inyokern Area. Economic reasons dictated the placing of the wells in the first place, but, in the long run, this approach is shortsighted. As pumping continues, especially in the Ridgecrest and Intermediate Areas, water levels will decline to the point where water costs and water qualtiy will become affected. In view of their recommendations that the wells be dispersed (the most effective use of available ground water would be a more even area distribution of the wells) some suggestions may be made such as the following:

   a. Placement of any new major well outside the present major pumping area (the USGS should be able to make recommendations).

   b. Abandonment of current wells when certain cost factors or hardness are exceeded.

   The implementation of these ideas is another matter. They have been mentioned primarily as areas in which the water suppliers group should become involved and of which the public should be made aware.

3. The perennial supply of water available to the Valley is probably sufficient to meet the needs of even an expanding population, if (a) large scale development (agriculture, industry or subdivision) is discouraged and (b) wiser water use were encouraged and practiced. A well publicized, effective water conservation effort could result in an immediate reduction of water consumption through more conservative water use. Modest desert gardens and the selective placement of trees adapted to dry conditions would save considerable water.

4. Large scale development, be it agriculture, industry or subdivisions, to the extent that the ground water storage will be depleted in a short time period would be unwise.

5. Re-use of treated waste water by recharge into an area where it could be filtered into the water table is a possibility which should be explored. Current practices for waste water removal include evaporation and water seepage into ground

water which is unfit for human or agricultural use. Searles Lake Chemical Company, under the proposed merger of the two sewer systems, at least ensures economically constructive use of the waste water. Purification of waste water for injection into the water table and reuse may become financially attractive in the near future and the potential should be economically reevaluated.

2. HYDRAULIC FORCE OF WATER

The hydraulic force of water can be devastating in certain instances. Dry stream beds become torrents during rain storms, sheet floods traverse flat terraces, and streams enlarge to the point where they fill the flood plain.

There are areas that are so adversely affected by the hydraulic forces of water that their use should be restricted to that of open space. No structural development should be permitted in these areas because of the hazard that exists.

Other areas are adversely affected by the hydraulic forces of water, however, the forces do not reach the same magnitude as those described above. In these areas special construction methods and standards must be employed.

Regulations, therefore, frequently have two parts: one dealing with channel encroachment and the other dealing with the flood plain. Failure to distinguish between those two parts will result in a misleading interpretation of the zoning ordinance and any court action related to it.

In the flood plain channel imposition of zoning in order to protect the safety of the residents is a legitimate action and the prohibition of any development may be a legitimate use of the zoning power.

Restrictive zoning within the flood plain, as proposed in this section, is designed to protect the public interest. It suggests an undertaking legitimately within the police power. Here specific uses are designated and construction methods and standards are required. Parks, recreational areas, mineral extraction, field crops, tree farms and similar uses are encouraged.

Ultimately, the validity of flood plain zoning will be sustained under the police power where there is some risk of flooding and the regulations permit a reasonable degree of use or provide for administrative relief.

A substantial inducement for communities to adopt flood plain zoning exists as a result of the National Flood Insurance Act

of 1968 (42 USC Section 4011 et. seq., 1970). Under the Act, the federal government provides subsidies toward private flood insurance for residences and up to medium sized businesses.

Insurance is available only where government in the area show a tangible interest in curbing land use and control measures. Insurance is also available against mudslide damage, under similar criteria for elegibility.

Goals

It is the goal of the City to implement a program that minimizes the danger caused by hydraulic forces of surface water.

Policy

1. Minimize development in areas in which water hazards exist, in order to protect the lives and property of the citizens.

2. Make engineering studies to determine the hazardous areas.

3. Zone areas identified as being adversely affected by hydraulic forces in a manner that provides the degree of safety compatible with the degree of risk.

4. Provide for storm water discharge in a manner that protects development from the hydraulic forces of storm waters.

5. Implement a management program to prevent the erosion of soils, sand and minerals.

Implementation

1. Obtain engineering studies from the Corps of Engineers which identify hazardous areas.

2. Zone areas to restrict their use in a manner commensurate with the established hazard and the degree of risk the community is willing to support.

3. Develop construction standards that insure that structures are adequately protected when constructed in hazardous areas and subjected to minor hydraulic forces.

STORM WATERS

I. INVENTORY

Detailed meteorological records have been kept in Indian Wells Valley since the Navy's arrival and primarily in the lower basin. Average rainfall over the last 25 years has been 2 1/2 inches with a low of 1/10 and a high of 9 1/2 inches. Rainfall in the upper valleys and hills increases with altitude until it reaches approximately 20 inches per year in the Sierra Nevada to the west.

The slow gentle rains which the area tends to receive in the winter are generally no problem as the percolation rate is reasonbly high in the sandy alluvium which fills the Valley to the west and the southwest, the areas which contribute the most rainfall to the ground water. However, heavy winter rains can occur; during the first two months of 1969, the weather station on the Center measured more than 4 inches of rain.

The September 1963 storm which flooded the northern part of Ridgecrest and the Michelson Laboratory basement area at the Naval Weapons Center was a typical summer tropical thunderstorm which deluged one area while leaving another area a few miles away more or less unscathed. In this case a large quantity of rain fell to the southwest in the Black Mountain area. The El Paso Wash, which drains part of this area, would have drained via the flood plain to the west of Ridgecrest and down into the bed of China Lake. Unfortunately the three 3-foot culverts under Highway 178 were not adequate and the excess water flowed east along the highway into the northern part of Ridgecrest and then into the Naval Weapons Center, which are both below the highway grade in places.

This storm caused considerable damage to Navy research facilities. Since the Naval Weapons Center has no control over where flood waters reach the base, the basin flood problem was finally referred to the US Army Corps of Engineers,which came into the Valley and proposed a channel/levee system west of Ridgecrest, called the Ridgecrest Wash Channel. The cost for this project was to be shared by the Naval Weapons Center and the US Army Corps of Engineers. Maintenance was to be provided by the Navy for its portion on the Naval Weapons Center and a maintenance tax was to have been levied on an improvement district in the Ridgecrest area to maintain the portion outside the Naval Weapons Center.

Before construction was finally authorized, the Kern County Water Agency terminated formation of the improvement district after the Board of Directors of the East Kern County Resources Conservation District and the Indian Wells Valley County Water District withdrew their support following a technical review.

The technical problems centered around the use of a standard project flood*(based on a 1932 flood at Tehachapi), which was needed to justify the project and other errors found in the original report. The report failed to take into account the presence of a diversion dike in the upper basin area and the relocation and elevation of Highway 395, which creates a natural ponding basin for much of the water coming from the southwest.

The Naval Weapons Center has dug drainage ditches which shunt storm water to the north away from the Michaelson Laboratory.

The current storm drain facilities of Ridgecrest (see map 4) are based on a runoff coefficient from a 10-20 year storm. Current and projected City budgets do not include facilities based on a greater storm intensity due to increased costs to build appropriate facilities. This storm drain plan has been completed by the City Engineer, but has not been approved by the City or the Naval Weapons Center.

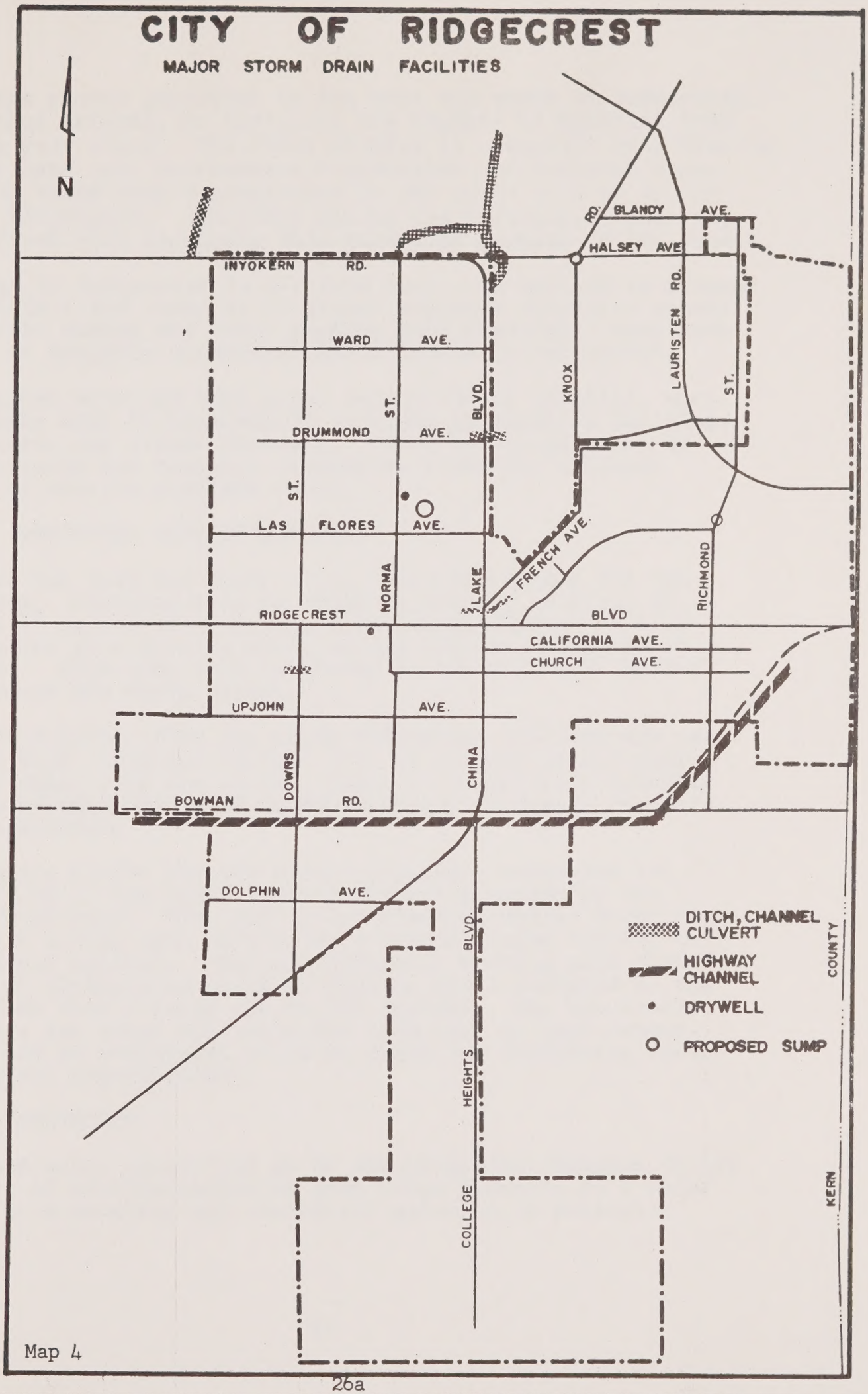
II. DEFICIENCIES

Sometime in the future another storm will inevitably occur bringing flood waters into Ridgecrest, most likely from the southwest. The map shows distinctly how the main area of China Lake and then ultimately Ridgecrest were placed directly in the path of potential flood waters from the south and west. The probable lack of high rainfall from low elevations to the south, lack of a large wash leading from these hills, good soil percolation and the gentle grade down to the Valley floor lead to the conclusion that sheet flooding (in contrast to wash or channel flow) could occur in the southeast part of Ridgecrest. The natural drainage is to the northeast through this part of town, on toward Satellite Lake which lies within the Naval Weapons Center. The area immediately to the southwest of Ridgecrest is also a likely area for sheet flooding. This area ultimately drains into Satellite Lake on the Naval Weapons Center.

Since most of the potential flood waters originate in the County, outside Ridgecrest and China Lake, Kern County's participation is necessary in any plans for the future. More comprehensive County flood control planning in the future may eventually alleviate the problem.

The Naval Weapons Center has two major storm water problems. The first of these is the need for diverting of floodwaters

* For this project the Corps of Engineers used a 300 year flood. The use of an x year flood is an abbreviation for the following, more stringent definitions: a 1 in x probability of occurence in any 1 year or 100/x percent chance of occurrence in any given year.


CITY OF RIDGECREST
MAJOR STORM DRAIN FACILITIES
N
INYOKERN RD.
WARD AVE.
DRUMMOND AVE.
LAS FLORES AVE.
RIDGECREST BLVD
UPJOHN AVE.
BOWMAN RD.
DOLPHIN AVE.
CALIFORNIA AVE.
CHURCH AVE.
HALSEY AVE
RD. BLANDY AVE.
LAURISTEN RD.
ST.
KNOX
BLVD.
ST.
ST.
NORMA
LAKE
FRENCH AVE.
RICHMOND
DOWNS
CHINA
BLVD.
HEIGHTS
COLLEGE
COUNTY
KERN
DITCH, CHANNEL CULVERT
HIGHWAY CHANNEL
DRYWELL
PROPOSED SUMP

Map 4

coming from storms generated to the west and south of Ridgecrest. The drainage ditches, as installed are capable of handling less than a 10 year storm. The other problem is potential over-flowing of Mirror Lake into surrounding residential and business areas, if a major storm were concentrated in the local area or to the south of Ridgecrest. Increased paving and building in the City of Ridgecrest will aggravate this potential problem in the future.

Many areas in Ridgecrest do not have curbs and gutters to channel local rainfall and carry it to proper drainage channels; consequently road damage and water ponding have resulted. Long term planning to complete unimproved areas should be instituted.

As Ridgecrest develops more areas impervious to rainfall, more storm waters must be disposed of in order to minimize building, intersection, and street flooding. Current City practice is to add culverts and drainage ditches as flooding, improper drainage or erosion problems occur.

III. PROJECTED DEVELOPMENT PLAN

Ridgecrest has only one major storm facility planned for the near future. Culverts will be added as needed. A sump, to take care of excess water draining from west Ridgecrest will collect water in a natural basin in the northeast quarter of Section 33. This sump will be placed to the northeast of Las Flores Avenue and Norma Street.

The Master Drainage Plan for south Ridgecrest includes the use of Bowman Road (proposed Highway 178) as a major interceptor for flood water from the south. Since it is entirely possible that this highway may never be constructed, alternate controls should be planned.

Naval Weapons Center has the money originally scheduled for their portion of the flood control channel proposed by the Corps of Engineers. They are in the planning-design stage of providing a scaled down version of a channel/levee similar to that proposed earlier. They are currently working with State Division of Highways on plans to replace the 3 culverts at the El Paso Wash with a large dip on the highway. The Department of Highways has money available for this type of improvement. The Navy has no additional plans or funds for increasing their flood control capabilities.

IV. OBSTACLES

Since flood water generation is on non-City/Naval Weapons Center land, lack of implementation of long range planning is a major obstacle to a sensible and economical solution to potential flooding.

The high costs of increased flood control capabilities (hundreds of thousands of dollars) are beyond the capabilities of the City.

Naval Weapons Center can only ask for funding for improvements actually located on government land.

V. CITIZEN'S PARTICIPATION

The formation of an advisory committee of representatives from the Navy, the City, the Indian Wells County Water District, the County and the Valley tax payers to cooperate, if and when another flood control investigation and plan is attempted, would be advisable. This committee would function only during investigation and implementation.

VI. FINANCING

For the area outside the City, Kern County could levy a tax on developments in the Valley which would benefit from a flood control project and build facilities appropriate to the flood potential and financial base.

The City Council budgets for drainage improvements within the City. Money generally comes from general funds, and improvement districts could be formed in the more hazardous areas to finance improvements beyond the 10 year storm level.

All public works projects for the Naval Weapons Center must be financed by the US Government.

VII. TIME SCHEDULE AND PRIORITIES

The sump northeast of the Norma Street and Las Flores intersection has been projected to be completed between 1975 and 1980. Naval Weapons Center plans to dig their channel/levee this year (1973). The Highway Department's work will hopefully be completed by summer 1974.

VIII. RELATIONSHIP OF STORM WATERS PLAN TO OTHER PLANS AND ELEMENTS OF THE GENERAL PLAN

Storm waters in the surrounding mountains are the source of our underground water in the basin. Excessive amounts (that do not percolate into the ground close to the mountains) should be used as a ground water recharge source in the western and southwestern parts of the Valley.

Zoning of potential flood plains as open space for parks is a desirable feature.

IX. CONCLUSIONS AND RECOMMENDATIONS

Further flood water studies are desirable for the Valley, especially in view of our rapidly expanding population.

The State Department of Water Resources and the Corps of Engineers indicated in 1972 that they would consider sharing costs for such a study from the San Bernardino County line to Jacks Ranch Road.

Such studies plus data already available on the area to the west and south of Ridgecrest should provide a firm basis for predicting possible storm damage and for proposing alternatives, if the need is shown by the study. A realistic cost/benefit ratio based on Kern County/Ridgecrest ability to pay is essential, as is the formation of the advisory committee before any construction work is contemplated. It would be the committee's prime function to assess the data to determine possible damage, to set the storm frequency level of prime concern and to decide what measures would be needed to minimize damage at what costs.

The following areas should be zoned as open space to ensure that no development takes place: Mirror Lake, Satellite Lake and the proposed five acre sump to the northeast of Las Flores/Norma intersection.

The possibility of special building construction codes for development in those areas of Ridgecrest particularly susceptible to sheet flooding should be considered.

FOREST

To many people, forests are valued primarily for their wood production. We are gradually beginning to realize that forests play a more basic role as a major portion of the land plantmass and as a watershed and wildlife habitat. Other secondary roles should be as areas for scientific study, wilderness, preservation and recreation.

California has been a forestry rich state for generations, however, most of the resources are concentrated in the mountains and the northerly part of the state. Those forests in Kern County, and particularly those within the sphere of interest of the City, are considered to be significant resources, vital to the economy and enjoyment of the citizens. This resource is one that must have good management, so it can be conserved, developed and utilized.

Forests do not exist within the City but it is felt these statements are necessary because the forests affect the water sheds and because of the people's concern for natural resources within the City's primary sphere of interest.

Goals

It is the goal of the City to express its interest in the forest

land and work with the various agencies for the conservation, development, and utilization of this resource; and to utilize forests for the multiple use benefits available.

Policy

It is the policy to support and assist the various agencies which have jurisdiction over the forest land to conserve, develop and utilize the forest lands for the benefit and enjoyment of the citizens.

SOILS

Many factors influence the value and use of soil, such as the degree of compaction in the subsoil, salt content, steepness of slope, drainage, and natural fertility. The amount of alkali salts is closely correlated with the degree of compaction and permeability of the subsoil in basin areas.

Many factors besides the character of the soil influence the suitability of crops in an area. The most important is the availability of water for irrigation. Soils derived from certain rocks are more fertile than others; some are suitable to one crop, but not to another.

Some soils are extremely vulnerable to erosion forces. The natural balance of nature can be upset by improper cut and fill operation. This is particularly true in urban areas where new developments are taking place. In urban areas soil erosion is often triggered by improper grading procedures which expose steep slopes to the forces of running water.

It is important that soils are used in accordance with their structural and compositional characteristics. It is also important to prevent erosion which is caused by inappropriate grading practices and is controllable.

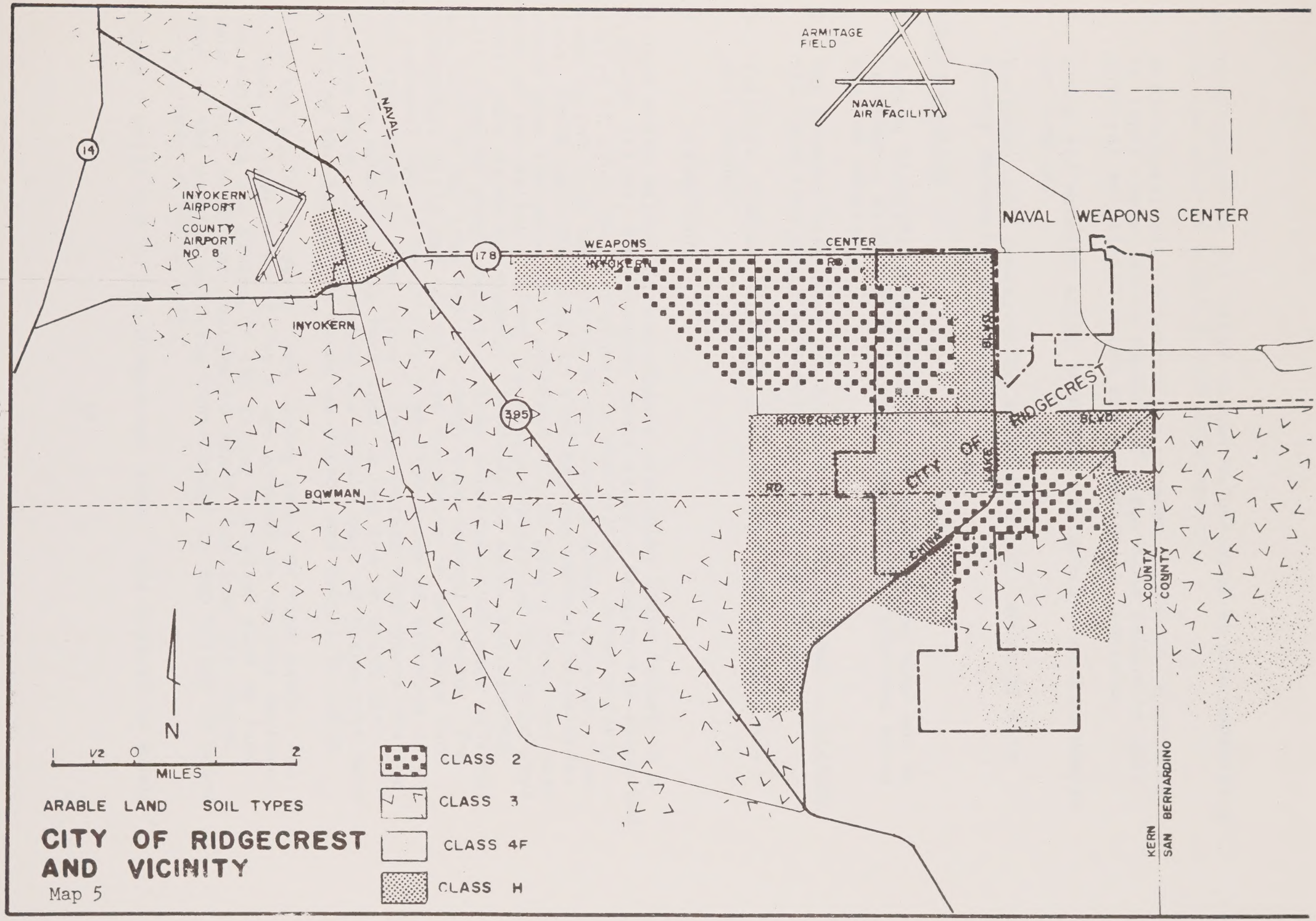
Goals

It is the goal of the City to develop land uses that are compatible with the capability of the soil and to discourage the improper use or waste of the soil by inappropriate use of practices which lead to erosion.

To prudently utilize the inherent capabilities of all soil groups to serve both short and long term interest.

Policies

1. The City will identify, as far as present day technology permits, areas of unstable soil.



ARABLE LAND SOIL TYPES

CITY OF RIDGECREST AND VICINITY

Map 5

2. Development in all areas should be governed by the capability of the soil to sustain such development.

3. Agricultural land conservation program should be restricted to lands having soils capable of supporting intensive agricultural activities which are economically feasible.

4. Steep and erosive soils should be protected from unnecessary development.

5. Suitable soil conservation measures in all areas of Kern County should be encouraged.

Implementation

1. Zoning classification suitable to regulate the land use in accordance with the soil capability and in hazardous areas will be adopted.

2. The General Plan Land Use Element will be updated to include the land uses compatible with the soil capabilities.

3. Initiate studies to obtain precise maps and evaluate all soil groups.

I. INVENTORY

Indian Wells Valley is a northerly trenching basin formed as a sediment filled, down-dropped fault block. Erosion has deposited layers of sand, mud and gravel in the Valley. Broad alluvial fans extend from the mouths of the Sierra Nevada canyons. The fans, which have coalesced to form bajadas several miles wide, slope from the escarpment eastward toward playas along the east side of the Valley. Along the western margin of the playa area small sand dunes are common. Deposits of sand, interspered with areas of playa deposits, form a transitional zone between the toes of the fans and the large east-central playas. The Rademacher Hills and the El Paso Mountains to the south form a pediment (solid rock) with a shallow cover of alluvium only one inch thick in some areas. Interspersed with these shallow soils are some alluvial fans such as the one on which the College sits. A topographic low exists east of Ridgecrest surrounding the dry playas known as Mirror and Satellite Lakes.

Thus the soils are sandy loam, loamy sand, or fine sand. All classes of land except Class 1 are present in varying degrees. The soils on the slopes of the Valley are loamy sand or fine sand. This condition changes to sandy loam near the playa. Most of the younger alluvium contributed to the Valley is below an altitude of 25000 feet.

Class 2 soils are in the Ridgecrest area. The topsoil is sandy

loam (finer grained sediment) which has a higher moisture retention than the loamy sand subsoil. The coarseness of the subsoil increases with depth. Class 3 soils consist of 24 to 30 inches of loamy sand overlying a gravelly sandy loam to at least 5 feet. This soil becomes coarser as the elevation of the land increases towards the mountains.

There are outcrops of stony material which could be the centers of old outwash fans protruding from the alluvial fill of the Valley. The Class 4 soils have 18 to 24 inches of loamy sand over coarser material, but may be suitable for certain types of deciduous fruits. The topography of the Class 4F soils may also be rougher than that of the Class 3 soil. The Class 6 soil is considered to have less than 12 inches of soil above clean sand, gravel or rock. This land is classed as nonarable. The Class H land includes commercial, residential and recreational areas.

Fertility is low, humus being almost non-existent. Salinity and alkalinity would not be a problem unless irrigation was attempted near the playas where salt and alkalai increase. Salt measurements on soil samples from arable land show from a trace to 0.015 percent salt. The allowable maximum for Class I soil is 0.2 percent and .05 percent for Class 2, 3 and 4 soils. Information on classes of soils and salinity data are taken from the Inland Basins Study.

Surface and subsurface drainage in the Valley is from surrounding mountains to the playas. The internal drainage is excellent in the sandier soils. The absence of harmful amount of salt indicates good drainage in the lower levels. Several gullies and washes extend from mountain watersheds to the playas.

There are no slopes of sufficient degree to cause problems of erosion or instability. The slopes in the area are generally less than 100 feet per mile and predominantly less than 50 feet per mile.

The USGS Study, "Geology and Ground Water of the Indian Wells Valley", stated that the soils are of a non-uniform nature. It has low permeability in many places, and surface concentration of alkalai in other places, generally near the playas. In some areas the sand is hard packed and contains calcium carbonate which results in a cement-like hardpan called caliche. Caliche will not soften in water and must be broken through by drilling or blasting. Caliche occurs in the east side of the Navy housing, and in the magazine area of the base and the south flank of the Coso Mountains where it is 12 feet to 15 feet thick. Other materials commonly but incorrectly called caliche are actually indurated dry clays occuring in the old shoreline areas. On the west side of the Valley there are bands of shoreline tuffa creating soils which are useless for agriculture.

Deficiencies

Official studies are contradictory. Soil samples gathered by local nurserymen indicate more salinity in the areas identified as Class II than is indicated in the Inland Basin Study. The Class II soil is found by residents to suffer from areas of impermeability and non-uniform quality. The greatest amount of farming is done in the western part of the Valley in the Class III soils. Before a large scale agricultural development is attempted careful restudy of the soils in question would be prudent.

Development

The soil identified as Class II is in the area most likely to be turned over to urban and residential development.

OTHER WATERS

In water resources the quantity and quality of water are major elements in structuring land use planning. The uneven geographical distribution of water resources and water quality in relation to land use; a disparate demanding urban and rural population; a wide variance in land quality and production; the need for protecting domestic use and the recreational amenities and scenic qualities all combine to give water planning, development, and protection a paramount role in shaping our environment.

Planning for water development is a critical element in environmental protection because of the direct effect of large scale water projects on the environment. Water development relates not only to the physical, but to the social, cultural and economic aspects of environment. It must be considered in terms of these effects, both beneficial and adverse, on the total environment.

Goals

1. It is the goal of the City to assure the land use near these areas enhances the public interest.

2. To obtain maximum benefit from limited water resources.

Policy

1. To base priority for utilization of effluent water on all factors assiciated with both the source and the contemplated use of the water.

2. Multiple use of water resources such as recreational use or waterfowl habitat use should be promoted in conjunction with ground water recharge areas.

3. Water contamination should be avoided by requiring suitable lot sizes in developments not providing sewage treatment facilities.

Implementation

1. California has in the Porter-Cologne Water Quality Control Act (Lahontan Region under the State Resources Control Basin Plan) the water quality standards which will be adhered to and enforced in order to provide an effective water pollution control measure.

2. Projects pertaining to waste waters will be evaluated in relationship to the source and proposed use.

3. Develop an overall waste water use plan for the Indian Wells Valley in conjunction with the Kern County Water Agency and all water districts to establish maximum benefits from the limited waste water resources.

4. Establish minimum lot sizes for areas not having sewage treatment facilities. Base lot size on effluent absorption capabilities of the soil, slope of the topography, and availability of potable water supply.

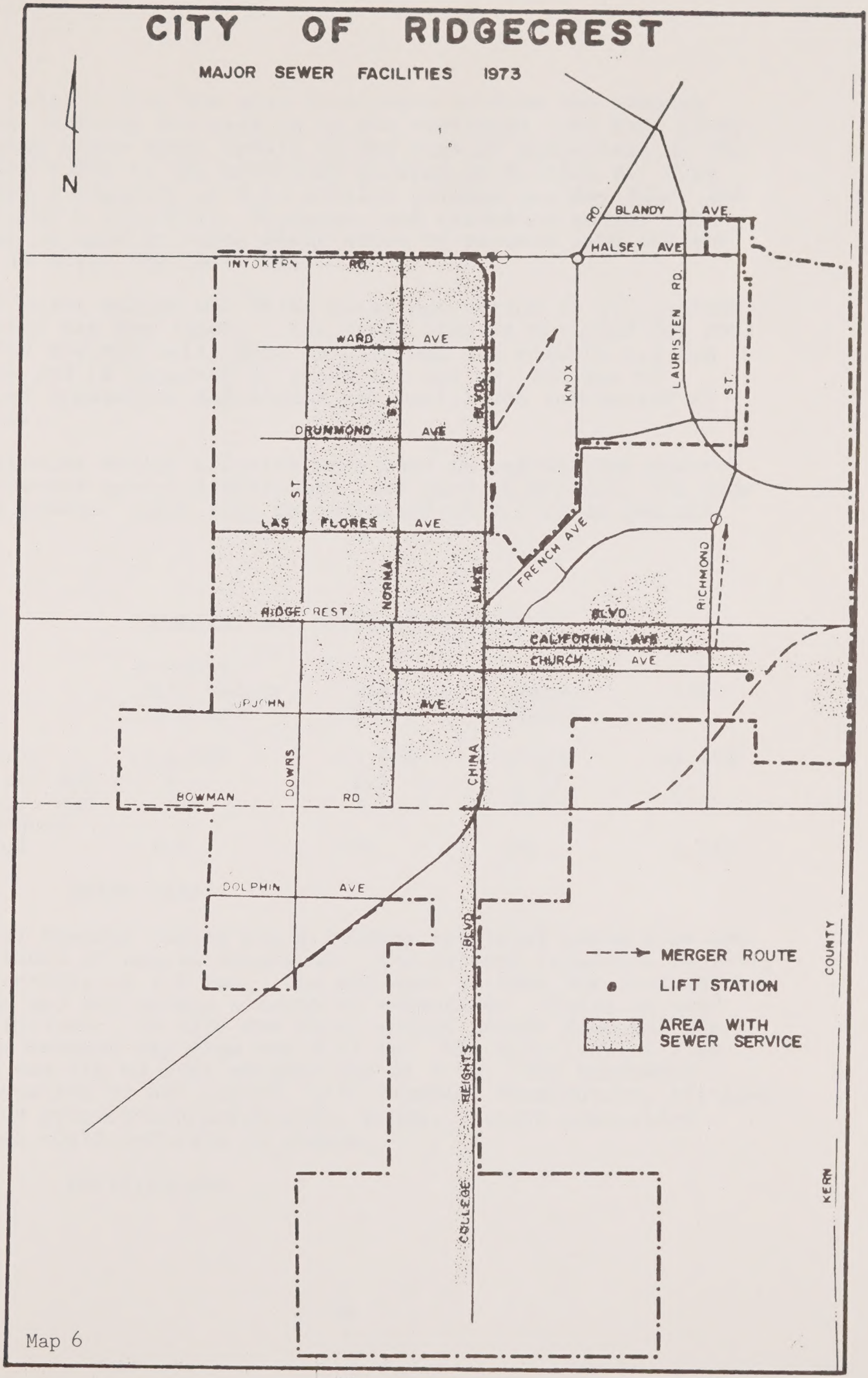
WASTE WATER

I. INVENTORY

A. Ridgecrest

The City provides sewer service for most homes and businesses within its limits. Less than ten percent of the homes are served by septic tanks or cess pools; most of these are in the southwest section of the City. The southeast quarter of Section 32 is in the process of being sewered and money has been budgeted for the west half of the northwest quarter of Section 28 and the northeast quarter of the northeast quarter of Section 29. The City could be completely served by the system by 1975 if the land owners using septic tanks would agree to the formation of assessment districts.

See map for details on current and proposed facilities. The City Engineer is currently revising and bringing up to date sewer plans for the entire City. Many decisions and plans have been delayed due to the planned merger of the China Lake and Ridgecrest sewer systems.


CITY OF RIDGECREST
MAJOR SEWER FACILITIES 1973
N
INYOKERN RD.
WARD AVE
DRUMMOND AVE
LAS FLORES AVE
RIDGECREST BLVD
CALIFORNIA AVE
CHURCH AVE
UPJOHN AVE
BOWMAN RD
DOLPHIN AVE
DOWNS ST
NORMA ST
LAKE BLVD
CHINA LAKE BLVD
COLLEGE HEIGHTS BLVD
KNOX
FRENCH AVE
RICHMOND BLVD
LAURISTEN RD.
ST.
RD. BLANDY AVE.
HALSEY AVE
KERN COUNTY
MERGER ROUTE
LIFT STATION
AREA WITH SEWER SERVICE

Map 6

At the present time the main facilities include two pumping stations (natural drainage is to the northeast into Navy land), which pump waste water uphill to the east of Ridgecrest to the treatment plant in the northeast quarter of Section 2. This plant has a capacity of 0.93 million gallons per day (mgd) and consists of a clarifier, digester, and oxidation ponds. The effluent is used to water forty acres of pasture land and the sludge is dried for fertilizer.

Current plant design and waste water production is 115 gallons per capita per day (gpcd). The sewer line is designed for 200 gpd. The average daily flow is 0.80 mgd but reaches 1.2 mgd at times and is expected to reach 1.5 mgd by 1980 due to increased population and higher per capita use (projected at 125 gpcd).

The following design criteria were used in calculating present and projected sewage discharges: 115 gpcd at present, 125 gpdc for the future; peak flow is estimated at 2.3 times average flow.

TABLE I

PRESENT AND PROJECTED DISCHARGE

	Present (w/o Wherry Housing)	1980 (Min.)	1980 (Max.)	1990
Population	10,500	12,500	14,000	20,000
Avg. flow, mgd	0.8	1.5	1.75	2.5
Peak flow, mgd	1.9	3.6	4.0	5.7
Total annual flow, mgd	295	570	770	1,100

B. CHINA LAKE

The Naval Weapons Center has a primary treatment plant plus two Imhoff tanks at remote locations. The primary treatment facility has a capacity of 2.0 mgd. The effluent is used for golf course watering and the excess allowed to evaporate. Sludge is used for fertilizer. In 1970 the total annual sewage flow was 570 mg. The maximum day flow was 2.63 mg. The total annual flow in 1969 was 610 mg with maximum day of 2.56. The treatment plant consists of bar screen, grit chamber comminutors, settling tanks and evaporation/percolation ponds. Future population decreases would indicate no change.

II. DEFICIENCIES

A. RIDGECREST

The design capacity of the treatment plant has been reached. If the proposed merger with the China Lake plant takes place, the waste waters from Ridgecrest would be taken to the China Lake treatment facilities. Existing plant facilities can handle 2.0 mgd. The combined average daily flow would be about this amount, so the treatment facilities there will be expanded. The City of Ridgecrest would manage the facilities. (Naval Weapons Center and City of Ridgecrest currently negotiating a contract with Searles Lake Chemical Company effluent to Searles Valley for use in the plant). This merger is in line with the Regional Water Control Plan suggested by the Lahontan Water Control Board.

III. PROPOSED DEVELOPMENT

A. RIDGECREST

The merger and expansion of the Ridgecrest/China Lake facilities would take care of waste water treatment until 1980. Mains and pumps at lift station #1 would be replaced if the merger does not develop. For further information refer to map and also to the 1968 and 1971 engineering feasibility studies prepared by the City Engineer.

IV. CAPITAL PROJECTS

The proposed merger will cost $1,200,000. The money would come from Federal and State grants and local tax money.

V. OBSTACLES

Funding for facilities expansion would be necessary if the merger does not take place.

VI. FINANCING

Current sewer services are financed by tax revenues through a property tax rate of $0.45/$100 of assessed valuation. Developers pay for sewer lines to their developments. Homes and businesses outside the original Sanitation District pay a fee for off-site facilities. Large scale facilities financing would have to be through hook-up fees and a rise in sewer taxes.

VII. TIME SCHEDULE - PRIORITIES

1973 a. Some preliminary alternate plans should be at once, in case the merger does not take place.

b. Replace pump #1.

by 1974 a. Implement plant expansion.

b. Replace other deficient pumps, mains and lines.

by 1975 a. Complete plant expansion.

by 1980 a. Replace all septic tanks and cesspools.

b. Plan for future facilities expansion according to population trends.

VIII. DEVELOPMENT

Rapid development is making unprecedented demands upon Ridgecrest sewer facilities. This expansion has already created an overload.

IX. RELATIONSHIP OF PLAN FOR WASTE WATER TO OTHER PLANS AND ELEMENTS OF THE GENERAL PLAN

Certainly the proper disposal of waste waters can have a profound effect on other areas. Improper or inadequate treatment of disposal can lead to fresh water contamination. After treatment the water could be used for several purposes: i.e., industrial, agricultural, groundwater recharge, wildlife habitat, and recreation. Possible water users in these areas are discussed in this Plan and the Open Space Plan.

Inadequate sewer capacity can, through exceeding State and County health standards, lead to freezing of development and effect housing. Wide spread and improper use of septic tanks and cesspools could lead to health and safety violations.

X. CONCLUSIONS AND RECOMMENDATIONS

1. Ridgecrest has passed its sewer facilities design capacity and effluent barely passes State standards. Rapid population increases (especially through subdivision development) will put the City in a bigger bind if the merger and expansion does not take place.

2. Future developments should be limited to the City's sewer capacity. Any expansion of facilities will automatically mean population increases. If the people of the area deem this increase a benefit then they should be expected to support financially such increases and the City should expedite facility construction.

3. When the Ridgecrest-China Lake sewer merger takes place, sufficient water should be left in the China Lake sewer ponds to secure it as a wildlife habitat.

FISHERIES

Goal

To increase research to find new ways to provide and manage fisheries and to develop new techiques for establishing recreational fishing areas.

Policy

1. Take all possible measures to protect and improve the management of fisheries.

2. Expand pollution control efforts to improve water quality for fish.

3. Make planned water projects for fish to insure adequate and suitable habitat.

Implementation

The City does not, at the present time, have fisheries within its jurisdiction; however, it will support those agencies which provide fisheries and recreational sites for fisheries.

WILDLIFE

Some of the critical concerns of wildlife and its natural habitats are centered on rare and endangered species. Generally, a wildlife habitat is a natural area which has a combination of factors such as terrain, soil type, and rainfall which produce specific conditions favorable to the propagation of certain animals. When this delicate balance of nature is disturbed by man-created factors, the animals that cannot adapt to the new environment are endangered with extinction. In many cases a few continue to survive, but eventually the species no longer exists.

Examples of endangered species in Kern County are the California Condor and the San Joaquin Kit Fox. Rare species include the Mojave Ground Squirrel and Kern Canyon Slender Salamander. All native bighorn sheep are fully protected, as is the ring tailed cat. There are many game animals in need of protection and mangement that are not classified as rare or endangered. These include quail, chukar, rabbit, bear, deer and water fowl. Kern County is among the top four counties in California in which quail and rabbits are taken by hunters. It is also a major source of chukar. These animals are hunted by people from the surrounding metropolitan areas. The hunters of these animals contribute to the economy of this County.

Land adminstered by the Bureau of Land Management and the United States Forest Service provides large areas of wildlife habitat within the County. The Fish and Game Department manages programs on lands having public access. Private land is also used as hunting grounds where the hunter leases rights of access and use.

While lands inhabited by most wildlife are not located in the City, the citizens have a vested interest in the conservation of wildlife habitat.

Goals

1. To promote the survival of all existing native wildlife species.

2. To properly use wildlife resources for recreational and conservation education purposes.

3. To discourage the promotion and preservation of introduced species which may be ecologically unsound and may interfere with native species.

Policy

1. The extinction of any species of animals is deemed unacceptable to the citizens of the City. Public and private owners of wildlife habitat are encouraged to operate these areas in a manner that reflects good management principles and conserves the wildlife habitat.

2. Within the sphere of interest of the City, the effect of land use projects and wildlife habitat will be reviewed by the Planning Agency in the decision-making process.

Inventory

See the checklist of Amphibians, Reptiles, Birds and Mammals of Indian Wells Valley and Surrounding Environs. The wildlife inventory includes a survey of reptiles, birds, and mammals of Indian Wells Valley and surrounding areas.

The inventory has two deficiencies. It does not include a catalog of inverterbrates (i.e. spiders, insects and fairy shrimp). One of the more important deficiencies is the absence of a survey of fairy shrimp species for the playas of Indian Wells Valley and surrounding areas. There is very little information available and a survey would require extensive research by a competent inverterbrate zoologist. The second is that the habitat listings for the snakes are incomplete due to lack of data.

Capital Projects

The City has no capital projects involving protection of wildlife habitat or establishment of wildlife preserves. Cerro Coso Community College has the only plan for protection of native desert flora and fauna. Cerro Coso Community College, which is located on the slopes of the Rademacher Hills (southeast quarter of Section 22) is surrounded by undeveloped national resource lands under the control of the Bureau of Land Management. The College has requested of the Bureau of Land Management that five sections (20,21, 22, 27 and 28), which adjoin the College, remain undeveloped and in "trust" for a College natural area or reserve.

The College plans 1) to fence 80 acres to the east of the building for a wildlife and plant reserve, 2) to eventually develop parts of the remaining acreage with nature walks and 3) to use Bureau of Land Management land for experimental research.

The lands surrounding the College take in two basic habitat type: Cresote Bush Scrub and Rock Slopes (with Cresote Bush Scrub). These habitats are typical of habitat found elsewhere in the Valley. No unusual or uncommon flora or faunal species are known to occur here. However several species of reptiles are protected or semi-protected under statutes of the California Department of Fish and Game Code. The desert tortoise is protected from collection or harassment; such reptiles as the desert iguana, desert horned lizard, rosy boa, collared lizard, leopard lizard and chuckwalla and banded gecko are protected by bag limits. The Mojave ground squirrel is also protected; it has the status of rare under Department of Fish and Game Codes.

Obstacles

Cerro Coso College is concerned with facts contributing to habitat deterioration and wildlife losses on College and adjacent national resource lands. These include off-road vehicle activity and shooting. The desert flora and fauna is fragile. Continued misuse of these areas will devalue the proposed natural areas/ nature reserve proposed by the College.

Relationship of Plan for Natural Resource Land to Other Plans and Elements of the General Plan

Protection of key wildlife habitats should be an integral part of the recreation plan.

Recommendations

The following recommendations are based on the assumptions that most people who live in the Indian Wells Valley as permanent residents do so out of choice and that there are certain inherent

values in the desert land and climate that are especially appreciated by these residents. Residents have mentioned such values as open space, clean air, low population density, lack of development and recreation potentials as desirable attributes of Indian Wells Valley.

1. The City of Ridgecrest is surrounded on the south and west by national resource lands under the control of the Bureau of Land Management. To the north and east lie lands under the jurisdiction of the Department of the Navy.

Lands within the City of Ridgecrest are composed of three habitat types for wildlife and native flora: a) planting and cultivated areas and housing tracts, b) ponds, marshes and drainage ditches, and c) Cresote Bush Scrub. Within twenty to fifty years most of the City land will be developed and there will be few, if any, areas within the City where native flora and fauna can exist in an undistrubed state.

The one exception to this will be Cerro Coso Community College and lands held in trust for Cerro Coso by the Bureau of Land Management. The City should encourage Cerro Coso and the Bureau of Land Management to maintain these areas as a nature reserve or research natural area.

Development of facilities at the sewer farms on both Ridgecrest and China Lake for bird watching and protection and encouragement of waterfowl is recommended. See Bird Checklist for the large number of birds found in sewer farm areas.

2. Because the City has only three of the ten basic wildlife and floral habitats and because the remaining habitats have values for recreation (bird watching, photography, wildlife enjoyment, aesthetic pleasures, views, etc.), the City should support the establishment of natural areas/ nature reserves in other lands within and adjacent to Indian Wells Valley and in maintaining prime desert lands in an undistrubed condition. Furthermore, such protected species as the ring tailed cat and legless lizard occur in the habitats.

To this end, the City should cooperate with the Bureau of Land Management to insure that such sites as the El Paso Mountains, Walker Pass and canyons on the east slopes of the Sierras (Indian Wells, Short and Sand), and the Fossil Falls at Little Lake be protected from deteriorating influences. All of these areas possess key wildlife and floral values. In addition the City may wish to look (and should look) farther afield at recreation areas frequently used by Valley residents, i.e., Fremont Valley, Panamint Valley and Owens Valley. Many areas

such as Surprise Canyon in the Panamint Range, have values such as rare species of plants and animals and unusual habitat associations that are found no where else in the world.

3. The City should encourage County, State and Federal agencies to take measures to protect key desert lands from deterioration by such activities as intensive sheep grazing and unregulated off-road vehicle use.

4. A recreation master plan for the City and Valley should include preservation of all basic desert habitat types. In addition to preservation, the unique recreational possibilities of the habitat types should be recognized (wildflower enjoyment, educational field trips, views, photography, wildlife observation, camping, picnicking, hiking, etc.) and controlling County, State and Federal agencies should be encouraged to protect and develop the areas with these features in mind.

CHECKLIST OF THE AMPHIBIANS, REPTILES, BIRDS AND MAMMALS OF INDIAN WELLS VALLEY AND SURROUNGING AREAS

These lists are based on field observations of the compilers and on museum records. The areas covered in the lists include Indian Wells Valley, adjacent canyons, and mountain ranges to the level of the piñon-juniper belt.

HABITAT TYPES FOR AMPHIBIANS, REPTILES, BIRDS AND MAMMALS OF THE INDIAN WELLS VALLEY AND SURROUNDING AREAS

1. Urban developments
2. Rural developments, cultivated areas
3. Sewage ponds, marshes, drainage ditches
4. Alkali sink associations
5. Creosote Bush Scrub
6. Shadscale Scrub
7. Joshua Tree woodland
8. Sagebrush Scrub
9. Piñon-juniper woodland
10. Wet canyons: a) Sierran, b) desert
11. Rock canyons
12. Open sky

AMPHIBIANS AND REPTILES OF INDIAN WELLS VALLEY AND SURROUNDING AREAS

by Kristin Berry

	Habitat Type
Order Amphibia	
Family Ambystomatidae Mole Salamanders	
Tiger Salamander (*Ambystoma tigrinum*)	exotic: 1,3,10a
Family Hylidae Tree Frogs	
Pacific Treefrog (*Hyla regilla*)	1,2,3,10a
Family Bufonidae True Toads	
Western Toad (*Bufo boreas*)	1,2,3,10a
Red-spotted Toad (*Bufo punctatus*)	10b
Order Reptilia	
Family Testudinidae, subfamily Testudininae, Gopher Tortoises	
Desert Tortoise (*Gopherus agassizi*)	1 (captive) 4-7,11
Family Gekkonidae Geckos	
Banded Gecko (*Coleonyx variegatus*)	4-9,10,11
Family Iguanidae Iguanid Lizards	
Desert Iguana (*Dipsosaurus dorsalis*)	4-7,11 (uncommon)
Chuckwalla (*Sauromalus obesus*)	5(11), 7(11)
Zebra-tailed Lizard (*Callisaurus draconoides*)	4-7,8
Collared Lizard (*Crotaphytus collaris*)	11: 5,7,8,9
Leopard Lizard (*Crotaphytus wislizenii*)	4-7,8
Desert Spiny Lizard (*Sceloporus magister*)	5,6,7,11
Western Fence Lizard (*Sceloporus occidentalis*)	9
Side-blotched Lizard (*Uta stansburiana*)	4-11
Desert Horned Lizard (*Phrynosoma platyrhinos*)	4-11
Family Xantusiidae Night Lizards	
Desert Night Lizard (*Xantusia vigilis*)	4(unc), 5,7
Family Scincidae Skinks	
Gilbert's Skink (*Eumeces gilberti*)	10a, 10b
Family Teiidae	
Western Whiptail (*Cnemidophorus tigris*)	4-11
Family Anguidae Alligator Lizards	
Southern Alligator Lizard (*Gerrhonotus multicarinatus*)	exotic: 1, 10a
Family Anniellidae Legless Lizardas	
California Legless Lizard (*Anniella pulchra*)	7-10 (Sierras only at Walker Pass)
Family Leptotyphlopidae Slender Blind Snakes	
Western Blind Snake (*Leptotyphlops humilis*)	4-9,11
Family Boidae Boas	
Rosy Boa (*Lichanura trivirgata*)	4-7,10,10

Family Colubridae

Spotted Leaf-nose Snake (Phyllorphynchus Decurtatus)	4-7,11
Red Racer (Masticophis flagellum)	2,3,4-11
Western Patch-nose Snake (Salvadora hexalephis)	4-9,10,11
Glossy Snake (Arizona elegans)	4-9,10,11
Gopher Snake (Pituophis melanoleucus)	2,3,4-11
Common Kingsnake (Lampropeltis getulus)	4-11
Western Ground Snake (Sonora semiannulata)	4-7,10,11
Western Shovel-nosed Snake (Chionactis occipitalis)	4-7,10-11
Utah Black-headed Snake (Tantilla planiceps utahensis)	4-11
Desert Night Snake (Hypsiglena torquata deserticola)	4-11

Family Viperidae, subfamily Crotalinae

Northern Pacific Rattlesnake (Crotalus viridis oreganus)	8,9 (Sierran, 10a
Mojave Desert Sidewinder (Crotalus certastes cerastes	4-7,10,11
Panamint Rattlesnake (Crotalus mitchelli stephensi)	11, 5,7-9,10
Mojave Rattlesnake (Crotalus scutulatus scutulatus)	5-7

Maturango Museum Press, China Lake, California

ABBREVIATIONS AND DEFINITIONS FOR BIRD CHECKLIST

Status (Definitions taken from The Distribution of the Birds of California by J. Grinnell and A. H. Miller, Cooper Ornithological Club, Pacific Coast Avifauna No. 2, Berkeley, California. 1944)

Res	RESIDENT	A species fixed in areal occurrence throughout the year.
SR	SUMMER RESIDENT	A species in residence during spring and summer periods, usually nesting in the area.
SV	SUMMER VISITANT	A species present in summer but not known to be in breeding residence.
WV	WINTER VISITANT	A species present during the intermigratory fall and/or winter periods.
M	MIGRANT	A species seen during spring and fall migration periods.
V	VAGRANT	A species which occasionally appears in an area outside its normal distribution area or off its ususal migration route.

Abundance (Definitions taken from Birds of North America by C. S. Robbins, B. Bruun and H. S. Zim, Golden Press, New York. 1966)

C	COMMON	A common bird may be seen most of the time or in small numbers everytime by a person visiting its habitat at the proper season.
O	OCCASIONAL	An uncommon or occasional bird may be seen quite regularly in small numbers in the appropriate environment or season.
Ra	RARE	A rare bird occupies only a small percentage of its preferred habitat or occupies a very specific limited habitat. It is usually found only by an experienced observer.

* presumed to occur here on the basis of known migration routes and distribution

BIRDS OF THE INDIAN WELLS VALLEY
AND SURROUNDING AREAS
by
Don W. Moore and John Dow

Family and Species	Abundance	Status	Habitat
Gaviidae Loon Family			
Common Loon (Gavia immer)	Ra	V	3
Podicipedidae Grebe Family			
Horned Grebe (Podiceps auritus)	Ra	V	3
Eared Grebe (Podiceps caspicus)	C	Res	3
Western Grebe (Aectimophorus occidentalis)	O	M	3
Pied-billed Grebe (Podilymbus podiceps)	O	M	3
Pelecanidae Pelican Family			
White Pelican (Pelecanus erythrorhynchos)	O	M	3,12
Phalacrocoracidae Cormorant Family			
Double-crested Cormorant (Phalacrocorax auritus)	Ra	V	3
Ardeidae Herons and Bitterns			
Great Blue Heron (Ardea herodias)	O	M	3
Green Heron (Butorides virescens)	O	M	3
Common Egret (Casmerodius albus)	Ra	M	3
Snowy Egret (Leucophoyx thula)	O	M	3
*Black-crowned Night Heron (Nycticorax nycticorax)	Ra	V	3
*Least Bittern (Ixobrychus exilis)	Ra	M	3
American Bittern (Botaurus lentiginosus)	O	M	3
Ciconiidae Ibises			
*Wood Ibis (Mycteria americana)	Ra	V	3
Threskiornithidae Ibises and Spoonbills			
White-faced Ibis (Plegadis chihi)	Ra	M	3
Anatidae Swans, Geese and Ducks			
Whistling Swan (Olor columbianus)	O	WV	2,3
Canada Goose (Branta canadensis)	C	WV	2,3
White-fronted Goose (Anser albifrons)	O	WV	2,3
Snow Goose (Chen hyperborea)	C	WV	2,3
Fulvous Tree Duck (Dendrocygna bicolor)	Ra	V	3

BIRDS OF THE INDIAN WELLS VALLEY
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Family and Species	Abundance	Status	Habitat
Gaviidae Loon Family			
Common Loon (*Gavia immer*)	Ra	V	3
Podicipedidae Grebe Family			
Horned Grebe (*Podiceps auritus*)	Ra	V	3
Eared Grebe (*Podiceps caspicus*)	C	Re	3
Western Grebe (*Aechmophorus occidentalis*)	O	M	3
Pied-billed Grebe (*Podilymbus podiceps*)	O	M	3
Pelecanidae Pelican Family			
White Pelican (*Pelecanus erythrorhynchos*)	O	M	3,12
Phalacrocoracidae Cormorant Family			
Double-crested Cormorant (*Phalacrocorax auritus*)	Ra	V	3
Ardeidae Herons and Bitterns			
Great Blue Heron (*Ardea herodias*)	O	M	3
Green Heron (*Butorides virescens*)	O	M	3
Common Egret (*Casmerodius albus*)	Ra	M	3
Snowy Egret (*Leucophoyx thula*)	O	M	3
*Black-crowned Night Heron (*Nycticorax nycticorax*)	Ra	V	3
*Least Bittern (*Ixobrychus exilis*)	Ra	M	3
American Bittern (*Botaurus lentiginosus*)	O	M	3
Ciconiidae Ibises			
*Wood Ibis (*Mycteria americana*)	Ra	V	3
Threskiornithidae Ibises and Spoonbills			
White-faced Ibis (*Plegadis chihi*)	Ra	M	3
Anatidae Swans, Geese and Ducks			
Whistling Swan (*Olor columbianus*)	O	WV	2,3
Canada Goose (*Branta canadensis*)	C	WV	2,3
White-fronted Goose (*Anser albifrons*)	O	WV	2,3
Snow Goose (*Chen hyperborea*)	C	WV	2,3
Fulvous Tree Duck (*Dendrocygna bicolor*)	Ra	V	3

Family and Species	Abundance	Status	Habitat
Mallard (Anas platyrhynchos)	C	Res	3
Gadwall (Anas strepera)	O	WV	3
Pintail (Anas acuta)	C	WV	3
Green-winged Teal (Anas carolinensis)	C	WV	3
Blue-winged Teal (Anas discors)	C	WV	3
Cinnamon Teal (Anas cyanoptera)	C	SR	3
American Widgeon (Mareca americana)	O	WV	3
Shoveler (Spatula clypeata)	C	WV	3
*Wood Duck (Aix sponsa)	Ra	V	3
Redhead (Aythya americana)	O	M	3
Ring-necked Duck (Aythya collaris)	O	V	3
Canvasback (Aythya valisinera)	C	WV	3
Greater Scaup (Aythya marila)	Ra	V	3
Lesser Scaup (Aythya affinis)	O	WV	3
Common Goldeneye (Bucephala clangula)	O	V	3
Bufflehead (Bucephala albeola)	C	WV	3
Ruddy Duck (Oxyura jamaicensis)	C	Res	3
Common Merganser (Mergus merganser)	O	M	3
*Red-breasted Merangser (Mergus serrator)	Ra	M	3
Cathartidae Vultures			
Turkey Vulture (Cathartes aura)	C	WV	12
Accipiteridae Kites, Hawks and Eagles			
White-tailed Kite (Elanus leucurus)	Ra	V	2,3
*Goshawk (Accipiter gentilis)	Ra	V	2
Sharp-shinned Hawk (Accipiter striatus)	O	WV	2
Cooper's Hawk (Accipter cooperi)	O	WV	2,10
Red-tailed Hawk (Buteo jamaicensis)	C	Res	2-12
Swainson's Hawk (Buteo swainsoni)	Ra	M	2-12
*Zone-tailed Hawk (Buteo albonotatus)	Ra	V	2-12
Ferruginous Hawk (Buteo regalis)	O	WV	2-5 (telephone pole)
Golden Eagle (Aquila chrysaetos)	O	Res	4-8,10-12
Marsh Hawk (Circus cyaneus)	C	WV	2,3
Osprey (Pandion haliaetus)	Ra	SV	3,12
Falconidae Falcon Family			
Prairie Falcon (Falco mexicanus)	O	Res	4-7,10-12
Peregrine Falcon (Falco Columbarius)	Ra	WV,M	2,3,10
Sparrow Hawk (Falco sparverius)	C	Res	2-9,10-12
Phasianidae Pheasants, Quail			
California Quail (Lophortyx californicus)	C	Res	2,7,10,11
Gambel's Quail (Lophortyx gambelii)	C	Res	2,5-7,10,11

Family and Species	Abundance	Status	Habitat
Mountain Quail (Oreortyx pictus)	C	Res	7-10
Chukar (Alectoris graeca)	C	Res	4-7,10,11
Rallidae Rails, Gallinules, Coots			
Virginia Rail (Rallus limicola)	O	Res	3
Sora Rail (Porzana carolina)	O	Res	3
Common Gallinula (Gallinula chloropus)	Ra	V	3
American Coot (Fulica americana)	C	Res	3
Plovers Charadriidae			
Semipalmated Plover (Charadrius semi-palmatus)	O	M	3
Snowy Plover (C. alexandrinus)	O	M	3
Killdeer (Charadrius vociferus)	C	Res	2,3
Mountain Plover (Eupoda montana)	Ra	V	2,3
Black-bellied Plover (Squatarola squatarola)	Ra	M	3
Scolopacidae Snipes, Sandpipers, Etc.			
Common Snipe (Capella gallinago)	O	M	2,3
Long-billed Curlew (Numenius americanus)	O	M	2,3
Whimbrel (N. phaeapus)	O	M	2,3
Spotted Sandpiper (Actitis macularia)	O	SV,M	3
*Solitary Sandpiper (Tringa solitaria)	Ra	V	3
Wandering Tattler (Heteroscelus incanum)	Ra	V	3
Willet (Latoptrophorus semipalmatus)	C	M	3
Greater Yellowlegs (Totanus melanoleucus)	C	M	3
*Lesser Yellowlegs (Totanus flavipes)	O	M	3
Least Sandpiper (Erolia minutilla)	C	M	3
Dunlin (Erolia alpina)	O	M	3
Long-billed Dowitcher (Limnodromus scolopacus)	C	M	3
Western Sandpiper (Erunetes mauri)	C	M	3
Marbled Godwit (Limosa fedoa)	O	M	3
Recurvirostridae			
American Avocet (Recurvirostra americana)	C	SR	3
Black-necked Stilt (Himantopus mexicanus)	C	SV	3
Phalaropodidae Phalaropes			
Wilson's Phalarope (Steganopus tricolor)	C	M	3
Northern Phalarope (Lobipes lobatus)	C	M	3

Family and Species	Abundance	Status	Habitat
Laridae Gulls and Terns			
California Gull (Larus californicus)	C	M	3
Ring-billed Gull (Larus delawarensis)	O	M	3
*Laughing Gull (Larus atricilla)	Ra	V	3
Franklin's Gull (Larus pipixcan)	Ra	M	3
Bonaparte's Gull (Larus philadelphia)	R-O	V	3
Forster's Tern (Sterna forsteri)	C	M	3
Black Tern (Chlidonis niger)	C	M	3
Columbidae Pigeons and Doves			
Band-tailed Pigeon (Columba fasciata)	Ra	V	10
Mourning Dove (Zenaidura macroura)	C	Res	1,2,5-9,10-12
Domestic Pigeon (Columba livia)	C	Res	1
Cuclulidae Cuckoos and Roadrunners			
Yellow-billed Cuckoo (Coccyzus americanus)	Ra	V	11
Roadrummer (Geococcyx californianus)	C	Res	4-9,11-12
Strigidae Owls			
Barn Owl (Tyto alba)	C	Res	1,2,7-10
Great Horned Owl (Bubo virginianus)	O	Res	7-11
Burrowing Owl (Speotyto cunicularia)	O	Res	2,3,4-7
Long-eared Owl (Asio otus)	O	M	1,9-10
Short-eared Owl (Asio flammeus)	O	WV	2,3
Caprimulgidae Goatsuckers			
Poor-will(Phalaenoptilus nuttallii)	C	SR	1,6,7
Lesser Nighthawk (Chordeiles acutipennis)	C	SR	1,4,5,7
Apodidae Swifts			
Vaux's Swift (Chaetura vauxi)	Ra	M	11
White-throated Swift (Aeronautes saxatalis)	O	SV,M	10,11
Trochilidae Hummingbirds			
Black-chinned Hummingbird (Archilochus alexandri)	C	SR	1,5,7,10,11
Costa's Hummingbird (Calypte costae)	C	SR	1,5,7,10,11
Anna's Hummingbird (Calypte anna)	O	SR	1
Broad-tailed Hummingbird (Selasphorus platycercus)	RA	M	9,10
Rufous Hummingbird (Selasphorus rufus)	C	SV	1,10
Alcedinidae Kingfishers			
Belted Kingfisher (Megaceryle alcyon)	Ra	M	3

Maturango Museum Press, China Lake, California

Family and Species	Abundance	Status	Habitat
Picidae Woodpeckers			
Yellow-shafted Flicker (Colaptes auratus)	Ra	V	1,2,7, 9,10
Red-shafted Flicker (Colaptes cafer)	C	WV	1,2,7, 9,10
Lewis' Woodpecker (Asyndesmus lewis)	O	M	1,9,10
Yellow-bellied Sapsucker (Sphyrapicus varius)	O	WV	1,10
Downy Woodpecker (Dendrocopos pubescens)	C	WV	1,10
Ladder-backed Woodpecker (D. scalaris)	O	SV, Res	7,10
Tyrannidae Flycatchers			
Western Kingbird (Tyrannus Verticalis)	C	SR	1,2,5, 7,10
Ash Throated Flycatcher (Myiarchus cinerascens)	O	SV,Res	7,10
Black Phoebe (Sayornis nigricans)	O	Res	1-3,10
Say's Phoebe (Sayornis saya)	C	Res	1-3,4-7, 10
*Gray Flycatcher (Empidonax wrightii)	Ra	Res	2,7,10
Western Flycatcher (Empidonax difficilis)	O	M	2,3,10
Olive-sided Flycatcher (Nuttallornis borealis)	Ra	M	1,2,5
Vermilion Flycatcher (Phrocephalus rubinus)	Ra	V	1,3,10
Alaudidae Larks			
Horned Lark (Eremophila alpestris)	C	Res	2,4-7
Hirundinidae Swallows			
Violet-green Swallow (Tachycineta thalassina)	O	M	2,3,12
Tree Swallow (Iridoprocne bicolor)	C	M	2,3,12
Bank Swallow (Riparia riparia)	Ra	M	2,12
Rough-winged Swallow (Stelgidopteryx ruficollis)	O	M	2,3,12
Barn Swallow (Hirundo rustica)	C	M	2,3,12
Cliff Swallow (Petrochelidon pyrrhonota)	C	M	2,3,12
Purple Martin (Progne subis)	Ra	V	2,3,12
Corvidae Jays, Magpies, Crows			
Steller's Jay (Cyanocitta stelleri)	Ra	V	1,10
Scrub Jay (Aphelocoma coerulescens)	O	V	1,9,10
Black-billed Magpie (Pica pica)	O	V	2,3
Raven (Corvus corax)	C	Res	1,2,4-7, 10,11+
Common Crow (Corvus brachyrhynchos)	Ra	V	1,2,10

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Family and Species	Abundance	Status	Habitat
Piñon Jay (Gymnorhinos cyanocephala)	C	Res	9
Paridae Titmice, Verdins, etc.			
Black-capped chickadee (Parus atricapillus)	Ra	WV,V	1
Plain Titmouse (Parus inornatus)	Ra	M	1,9
Verdin (Auriparus flaviceps)	Ra	Res,SV	1
Common Bushtit (Psaltriparus minimus)	O	V	9,10
Sittidae Nuthatches			
Red-breasted Nuthatch (Sitta canadensis)	C	WV	1
White-breasted Nuthatch (Sitta carolinensis)	O	WV	1,10
Troglodytidae Wrens			
House Wren (Troglodytes aedon)	C	M	1,2,10
Bewick's Wren (Thryomanes bewickii)	C	Res	1,2,10
Cactus Wren (Camphlorhynchus brunneicapillum)	C	Res	7
Long-billed Marsh Wren (Telmatodytes palustris)	C	Res	3
Rock Wren (Salpinctes obsoletus)	C	Res	11: 5,7,10
Mimidae Mockingbirds and Thrashers			
Mockingbird (Mimus polyglottos)	C	Res	1,7
California Thrasher (Toxostoma redivivum)	O	V	9
LeConte's Thrasher (Toxostoma lecontei)	C	Res	4,5,7
Crissal Thrasher (Toxostoma dorsale)	Ra	V	5
Sage Thrasher (Oreoscoptes montanus)	O	WV(4,6)	SR (6)
Turdidae Thrushes and Bluebirds			
Robin (Turdus migratorius)	C	WV	1,2,10
Varied Thrush (Ixoreus naevius)	Ra	V	1
Hermit Thrush (Hylocichla guttata)	C	WV,M	1,7,9,10
Western Bluebird (Sialia mexicana)	O	WV	1,2,10
Mountain Bluebird (S. currucoides)	C	WV	1,5,7, 9,10
Townsend Solitaire (Myadestes townsendi)	Ra	WV	1,10
Sylviidae Gnatcatchers, Kinglets			
Blue-gray Gnatchatcher (Polioptila caerulea)	Ra	M	9,10
Black-tailed Gnatcatcher (Polioptila melanura)	O-Ra	Res	10,12

Family and Species	Abundance	Status	Habitat
Golden-crowned Kinglet (Regulus satrapa)	Ra	V	1
Ruby-crowned Kinglet (Regulus calendula)	C	WV	1,9
Motacillidae Wagtails			
Water Pipit (Anthus spinoletta)	C	WV	2,3
Bombycillidae Waxwings			
Bohemian Waxwing (Bombycilla garrula)	Ra	V	1
Cedar Waxwing (Bombycilla cedrorum)	C	WV	1
Ptilogonatidae Silky Flycatchers			
Phainopepla (Phainopepla nitens)	O	SR,V	1,7
Laniidae Shrikes			
Loggerhead Shrike (Lanius ludovicianus)	C	Res	2-7+
Sturnidae Starlings			
Starling (Sturnus vulgaris)	C	Res	1,2
Vireonidae Vireos			
Solitary Vireo (Vireo solitarius)	O	M	1,10
Warbling Vireo (Vireo gilvus)	O	M	1,10
Parulidae Wood Warblers			
Black and White Warbler (Mniotilta varia)	Ra	M	1
Orange-crowned Warbler (Vermivora celata)	O	SV	1,10
*Nashville Warbler (V. ruficapilla)	Ra	M	1
Yellow Warbler (Dendroica petechia)	O	SV	1,3,10
Audubon's Warbler (D. auduboni)	C	WV	1,2,7,10
Black-throated Grey Warbler (D. nigrescens)	O	M	5,7
Townsend's Warbler (D. townsendi)	O	M	1,7,10
*Hermit Warbler (D. occidentalis)	Ra	M	1,10
McGillivray's Warbler (Oporornis tolmiei)	C	M	1,10
Yellow-throat (Geothlypis trichas)	O	M	1,3,10
Yellow-breasted Chat (Icteria virens)	O	M	1,10
Wilson's Warbler (Wilsonia pusilla)	C	M	1,10
American Redstart (Setophaga ruticilla)	Ra	M	1,10
Icteridae Blackbirds and Orioles			
Western Meadowlark (Sturnella neglecta)	C	Res	2,3

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Family and Species	Abundance	Status	Habitat
Yellow-headed Blackbird (Xanthocephalus Xanthocephalus)	O	M	2,3
Red-winged Blackbird (Agelaius phoeniceus)	C	M	2,3
Scott's Oriole (Icterus parisorum)	O	SR	7
Bullock's Oriole (Icterus bullockii)	C	SR,M (5,7)	1,10
Hooded Oriole (I. cucullatus)	O	SV(SR)	1,10
Brewer's Blackbird (Euphagus cyanocephalus)	C	Res	1,2
Brown-headed Cowbird (Molothrus ater)	C	SR	1,2
Thraupidae Tanagers			
Western Tanager (Piranga ludoviciana)	C	M,SV	1,5,9,10
Fringillidae Finches, Towhees, Sparrows			
Black-headed Grosbeak (Pheucticus melanocephalus)	C	M	1,2,10
*Blue Grosbeak (Guiraca caerulea)	Ra	V	1,10
Lazuli Bunting (Passerina amoena)	Ra	M	10
Evening Grosbeak (Hesperiphona vespertina)	Ra	V	1
Purple Finch (Carpodacus purpureus)	Ra	V	1
House Finch (Carpodacus mexicanus)	C	Res	1,2,4-7 10
Pine Siskin (Spinus pinus)	O	M	1,9
American Goldfinch (Spinus tristis)	O	WV	1,2
Lesser Goldfinch (Spinus psaltria)	C	SV	1,4,7
Lawrence's Goldfinch (S. lawrencei)	O	M,SV	1,2,10
Green-tailed Towhee (Chlorura chlorura)	Ra	M	9
Roufous-sided Towhee (Pipilo erythrophthalmus)	O	Res	1,7, 9,10
Brown Towhee (P. fuscus)	O	Res	10
Savannah Sparrow (Passerculus sandwichensis)	C	M	2,3,4-7
*Vesper Sparrow (Pooecetes gramineus)	Ra	V	2,3,4-7
Lark Sparrow (Chondestes grammacus)	O	SV	2,5,8
Black-throated Sparrow (Amphispiza bilineata)	O	Res	4-7
Sage Sparrow (Amphispiza belli)	C	Res	5,6
Oregon Junco (Junco oreganus)	C	WV	1,2,5-9
Slate-colored Junco (Junco hyemalis)	Ra	WV	1,5-7
Chipping Sparrow (Spizella passerina)	O	M	5,6
Brewer's Sparrow (Spizella breweri)	O	Res	1,5-7
Black-chinned Sparrow (S. atrogularis)	Ra	SV	5,6
Harris' Sparrow (Zonotrichia querula)	Ra	M, WV	6,8
White-crowned Sparrow (Zonotrichia leucophrys)	C	WV	1,2,5-9 10

Family and Species	Abundance	Status	Habitat
Golden-crowned Sparrow (*Z. atricapilla*)	O	WV	1,2,5-7
Fox Sparrow (*Passerella iliaca*)	C	M	2,3,5-7
Lincoln Sparrow (*Melospiza lincolnii*)	Ra	M	3
Song Sparrow (*M. melodia*)	C	WV	3,10
Ploceidae Weaver Finches			
English Sparrow (*Passer domesticus*)	C	Res	1

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MAMMALS OF THE INDIAN WELLS VALLEY AND SURROUNDING AREAS

by

Kristin H. Berry

	Habitat Type
Order Marsupialia	
Family Didelphidae	
Opossum (*Didelphis maruspialis virginiana*)	Sierran affinites: Jawbone, Dove Springs, etc.
Order Insectivora	
Family Soricidae Shrews	
Ornate Shrews (Sorex ornatus ornatus	Little Lake
Crawford's Desert Shrew (*Notisorex crawfordi*)	5,7+
Order Chiroptera	
Family Vespertilionidae	
Little Brown Myotis (*Myotis lucifugus carissima*)	
California Myotis (*M. californicus stephansi*, *M. c. californicus*)	
Yuma Myotis (*M. yumanensis sociabilis*, *M. y. yumanensis*)	
Long Eared Myotis (*M. evotis evotis*)	
Fringed Myotis (*M. thysanodes*)	
Long-legged Myotis (*Myotis volans interior*)	
Small-footed Myotis (*M. subulatus melanorhinus*)	
Western Pipistrelle (*Pipistrellus h. hesperus*)	11: 5+
Big Brown Bat (*Eptesicus fuscus pallidus*, *E. f. bernardinus*)	
Red Bat (*Lasiurus borealis teliotus*)	
Hoary Bat (*Lasiurus Cinereus Cinereus*)	
Spotted Bat (*Euderma maculatum*)	
Townsend's Big-eared Bat (*Plecotus/Corynorhinus townsendii pallescens*)	
Pallid Bat (*Antrozous pallidus pallidus*)	
Family Molossidae	
Brazilian Free-tailed Bat (*Tadarida brasiliensis mexicana*)	
Order Lagomorpha	
Family Leporidae	
Black tailed Hare (*Lepus californicus deserticola*)	2-11
Audubon Cottontail (*Sylvilagus auduboni arizonae*)	2,3,5,7-11

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	Habitat Type
Order Rodentia	
Family Sciuridae	
Beechey or California Ground Squirrel (Otospermophilus beecheyi)	7-10a
Panamint Chipmunk (Eutamias panamintinus)	9
Antelope Ground Squirrel (Ammospermophilus leucurus)	3-9,10,11
Mojave Ground Squirrel (Citellus mojavensis)	5
Family Geomyidae	
Botta Pocket Gopher (Thomomys bottae)	5,7+
Family Heteromyidae	
Little Pocket Mouse (Perognathus longimembris)	4-9,11
Long-tailed Pocket Mouse (Perognathus formosus)	4-9,11
Great Basin Pocket Mouse (Perognathus parvus)	8,9+(Argus Mountains)
Yellow-eared Pocket Mouse (Perognathus xanthanotus)	7-9 Walker Pass only
Panamint Kangeroo Rat (Dipodomys panamintinus)	5-8+
Great Basin Kangeroo Rat (Dipodomys microps)	4
Merriam Kangeroo Rat (Dipodomys merriami)	4-8+
Desert Kangeroo Rat(Dipodomys deserti)	4-5
Family Cricetidae	
Western Harvest Mouse(Reithrodontomys megalotis metalotis)	10
Canyon Mouse (Peromyscus crinitus stephansi)	11: 5,6,7+
Cactus Mouse (Peromyscus eremicus eremicus)	8,9
Deer Mouse (Peromyscus maniculatus sonoriensis)	4-11
Brush Mouse (Peromyscus boylii boylii)	9,10a
Piñon Mouse (Peromyscus truei montipinoris P. t. truei)	8,9,10 ab
Southern Grashopper Mouse (Onychomys torridus pulcher)	4-9
Desert Woodrat (Neotoma lepida lepida)	11: 5-9 7 without 11
Family Erethizontidae	
Porcupine (Erethizon dorsatum)	10a
Family Canidae	
Kit Fox (Vulpes macrotis arsipus)	4-9,10,11
Gray Fox (Urocyon cineroargenteus)	10a
Coyote (Canis latrans)	1-11
Family Procyonidae	
Ringtail Cat (Bassariscus astutus willetti)	5,7+, 10 ab
Racoon (Procyon lotor psora)	10a
Family Mustelidae	
Long-tailed Weasel (Mustela frenata pulchra)	4,7-10

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Badger (*Taxidea taxus berlandieri*)		1-11
Spotted Skunk (*Spilogale putorius*)		4-9
Striped Skunk (*Mephitis mephitis*)		10a
Family Felidae		
Bobcat (*Lynx rufus baileyi*, *L. r. californicus*)		2-11
Order Artiodactyla		
Family Bovidae		
Bighorn Sheep (*Ovis canadensis*)	Desert Mts.	8,9,10b
Order Perissodactyla		
Family Equiidae		
Burro		4-11

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MINERALS

I. INVENTORY

Many mineral claims have been filed within the Valley, and claims have been worked in the past; however, there is no significant amount of mining being done at the present time.

Salts and borates are found in the playas; onyx has been located within the Naval Weapons Center Test Area; and tungsten, gold, feldspars, pumice, mica, wollastonite, and clays have been found in the surrounding hills and alluvial fans, but no significant amount is being recovered at present. There are local sand and gravel operations. The local sands and gravels are not ideally suited for use by the construction industry because of their respective feldspar content.

II. TIME SCHEDULE - PRIORITIES

New discoveries or circumstances might make mineral recovery possible in the future. Therefore, the City should adopt an ordinance controlling use of land for mineral exploration and production, such ordinance to require non-pollution of air and water during production and restoration of land after use.

III. RELATIONSHIP OF PLAN FOR MINERALS TO OTHER PLANS AND ELEMENTS OF THE GENERAL PLAN

Effort should be made to coordinate any future use of mineral lands with other elements of the General Plan. For instance, soilfill might be recoverable from flood plain area, thus increasing storage capacity. If it were impossible to restore mineral lands to original condition after use, these lands might be put into such condition as to be suitable for use by bicycles or motorcycles, provided surroundings allow such use.

OTHER RESOURCES

Botanical

As a natural resource, the botanical community is frequently slighted when conservation programs are proposed, yet this classification is vital to a balanced program. Kern County is ideally located at a point where high desert, low Great Central Valley; Sierra Nevada, Techachapi, and Temblor Mountains converge to form a variety of environmental conditions. The confluence of these various botanical regimes has produced a large array of natural plant communities. Specialized vegetation associations include botanic species that are unique as remnants of pre-existing natural vegetation which has been either eliminated from other vicinities, or in response to

environmental changes created by human occupancy, have been greatly altered in that organic structure.

Those natural botanic communities that remain, especially those endemic to Kern County are worthy of protection. Existing land use practices do not provide protection but instead pose a real and immediate threat to some of the unique plant communities. In most cases the botanic areas are compatible with the plant life. Limited livestock grazings is frequently compatible with many varieties of plants. All botanic areas serve as wildlife habitat--some encompassing the prime habitat of several rare and endangered animal species. A well developed program can provide protection for multiple uses and, thereby, enhance the overall value of the project.

Goals

To preserve natural areas having endangered and/or rare species.

To preserve natural areas having unique plant types or plant communities.

To preserve selected natural areas having typical plant types of plant communities.

Policy

1. Areas containing unique plant life should be restricted or human use minimized, so uses will not be detrimental to plant types.

2. The inclusion of identified areas containing unique plant life into specific land conservation programs by all governmental agencies should be provided.

3. The off-road vehicle use in identified unique plant life areas should be denied.

Implementation

1. Establish regulations preventing off-road vehicle use in identified unique plant life areas, both on public and private land.

2. Amend established zoning, where necessary, to prevent use of land that may be detrimental to unique plant types in identified areas.

INVENTORY OF THE NATURAL BOTANIC COMMUNITIES

Within the City there are three basic habitat types: 1) planted and cultivated areas and housing tracts, 2) ponds, marshes and drainage ditches, and 3) Creosote Bush Scrub plant community.

The native plant communities that are found on lands surrounding the City such as Creosote Bush Scrub, are described below:

Alkali Sink

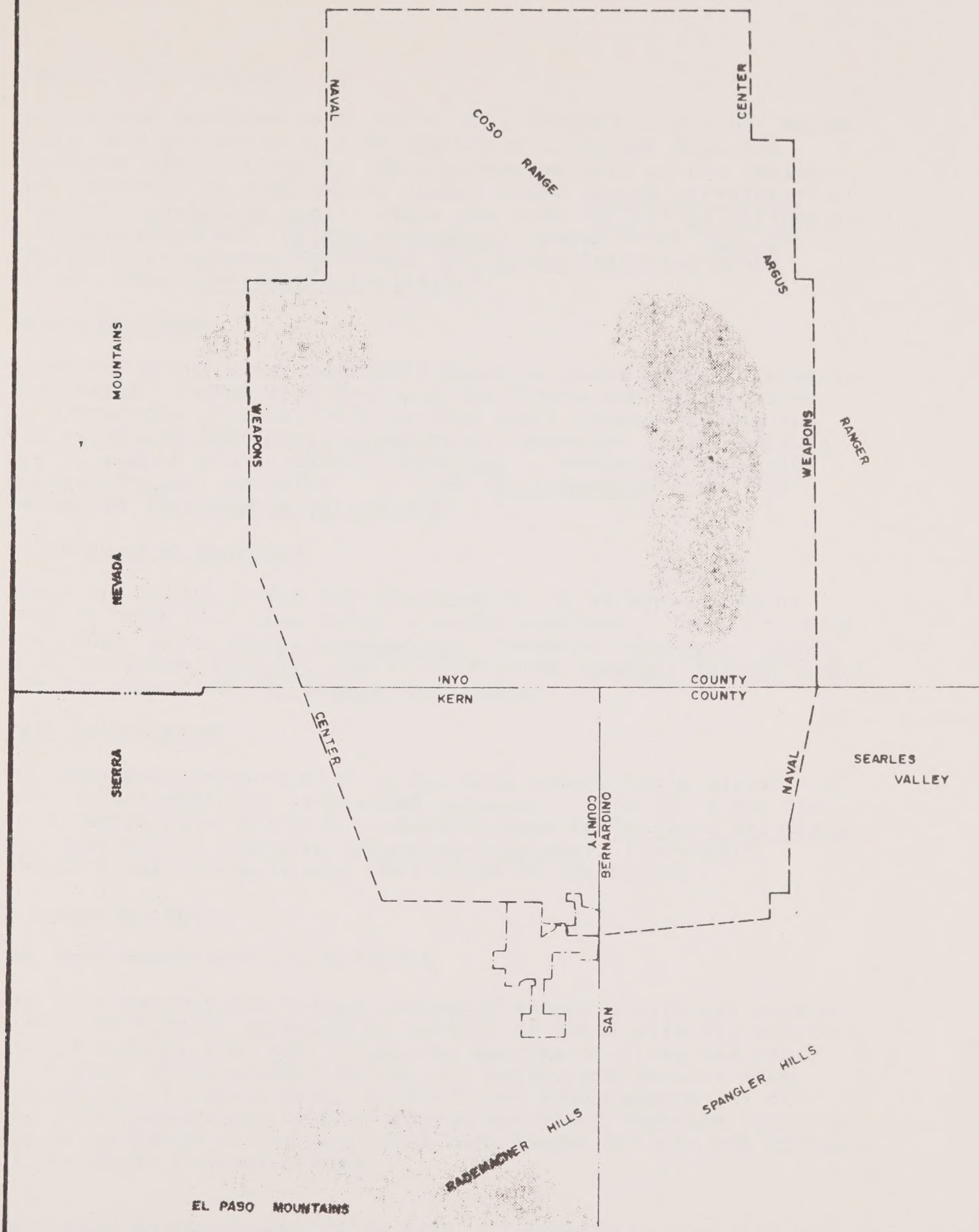
Alkali Sink plant community is found on poorly drained alkaline flats and about playas at elevations below 3000 feet. The community is composed of such shrubs as pickleweed (Allenrolfea occidentalis), inkweed (Suadea Torreyana), and such species of salt, bush as Parry saltbush (Atriplex Parryi), allscale (A. polycarpa), shadscale (A. confertifolia), desert holly (A. hymonelytra), and bald-leaved felt thorn (Tetradymia glabrata). Alkali Sink plant communities are located on the Naval Weapons Center, China Lake adjacent to the playas of Mirror Lake and China Lake and in Searles Valley and Poison Canyon.

Cresote Bush Scrub

This plant community lies adjacent to and at elevations above Alkali Sink. Creosote Bush Scrub is found on well-drained soils of slopes, alluvial fans, and in valleys, usually at elevations below 3500 feet. Creosote bush, (Larrea divaricata) is the indicator species. Associated species include burrobush (Ambrosia dumosa), cheese bush (Hymenoelea salsola),goldenhead (Acamptopappus sphaerocephalus), Fremont Dalea (Dalea Fremontii), silver cholla (Opuntia echinocarpa),beavertail (O. basilaris), and Anderson thornbush (Lycium Andersoni). Cresote Bush plant community interdigitates with alkali sink and species of Atriplex at lower elevations. At higher elevations Creosote Bush Scrub plant community can be found in association with Shadscale Scrub and Joshua Tree Woodland.

Shadscale Scrub

This plant community is often found between Creosote Bush Scrub and Joshua Tree Woodland in heavy soils of flats and mesas at elevations between 3000 and 6000 feet. Common shrubs include shadscale (Atriplex confertifolia), spiny hop sage (Grayia spinosa), winter fat (Eurotia lanata), black brush (Coleogyne ramosissima), and match weed (Gutierrezia spp.).



AREAS OF OUTSANDING PLANT COMMUNITIES WHICH SHOULD BE PRESERVED AS OPEN SPACE IN THE INDIAN WELLS VALLEY.

Map 7

Joshua Tree Woodland

Joshua Tree Woodland is found on well drained slopes and mesas. There is a particularly fine community in Walker Pass and scattered associations in the southwester part of the Valley. The community is composed of Joshua Trees (Yucca brevifolia), junipers (Juniperus spp.), paper bag bush (Salazaria mexicana), Anderson thornbush (Lycium Andersoni), peach thorn (Lycium Cooperi), California buckwheat (Eriogonum fasiculatum) and cotton thorn (Tetradymia axillaris).

Sagebrush Scrub

Sagebrush Scrub plant community forms in areas between Creosote Bush Scrub, Joshua Tree Woodland and Pinyon Juniper Woodland at elevations of about 3000 to 6000 feet. Common shrubs are big sagebrush (Artemesia tridentata), antelope brush (Purshia spp.), rabbit brush (Chrysthamnus spp.), shadscale (Atriplex confertifolia), fourwing saltbush (A. canescons), and bud sagebrush (Tetradymia spinescens).

Piñon-Juniper Woodland

Above the Joshua Trees and Sagebrush Scrub at elevations of 5000 to 8000 feet lies Piñon Juniper Woodland. Common species are piñon pine (Pinus monophylla), junipers (Juniperus spp.), antelope brush (Purshia spp.), cliff rose (Cowania Stansburiana) and big sagebrush (Artemesia tridentata).

Rare Wildflowers

The Conservation General Plan for Kern County has a listing of rare wildflowers and associated habitats. Site No. 9 for the Kern Camissionia (correct scientific name is Onothera kernensis) and Charlotte's Phacelia (Phacelia Nashiana), lie within Indian Wells Valley on the East slope of the Sierra.

Recommendations

See Recommendations for Wildlife.

The City Council and Valley residents should advise all County, State and Federal agencies in control of lands with key habitats and possessing rare and endangered species of flora and fauna to protect those sites. Within our Valley are several such locations: a) Walker Pass, b) Short and Sand Canyons, c) the Red Rock Canyon-Last Chance Canyons and Black Mountain vicinity, and d) portions of the Argus and Coso Ranger (within the confines of the Naval Weapons Center).

AIR QUALITY

Air pollution is a growing problem in the Indian Wells Valley. The Valley forms a basin which is very susceptible to pollution from any source within or near the Valley. The sources of pollution in order of importance are as follows:

1. Smog from the Los Angeles and Antelope Valley areas, brought in by southerly winds.

2. Smog and debris from the San Joaquin Valley, brought by the more westerly winds.

3. Dust from Owens Lake when winds are from the north. This severe condition occurs a few days a year, usually in the spring. This is the source of pollution which appears to be the most easily eliminated. It has been estimated that this dust comes from an area of only a few square miles. It could be controlled with a salt seal established by pumping saline water, spreading it over the surface and letting it evaporate to form a salt crust. The former waters of Owens Lake contained arsenic and if the remaining dust also contains arsenic there would be further reason to control it with a salt seal.

4. Pollution from the Valley itself. It is collected by a local thermal inversion layer which forms under clear, windless conditions at night. The inversion breaks up after sunrise and is usually destroyed before noon. On the usual days the wind keeps locally generated pollution swept out. The many miles of frequently used dirt roads and freshly graded highway shoulders are a constant source of airborne dust. Careless construction practices and/or agricultural activities could make it a lot worse. If the population of the Indian Wells Valley were to double, air pollution of our own would be significant. As it is, there is a quarter million dollar loss on Naval Weapons Center ranges because of atmospheric osbcuration.

APPENDIX A

The Role of the City

The City, in implementing the plan, will use zoning regulations, building setback regulations, subdivision regulations, building codes, health codes and housing codes. As supplementary material, various other elements of the General Plan should be used. These include land use, circulation, housing, open-space, seismic safety, noise and scenic highway elements. In addition to its use in long-range planning, the plan will be used as a guide in making capital improvements.

The zoning ordinance is the primary means of translating land use proposals into precise land use patterns. The purpose of zoning is to regulate the use of land and buildings and to protect areas of uniform development from incompatible land uses. Lot size and the location of structures are also functions of the zoning ordinance. Substantial tax monies are saved because utilities and other services can be planned and developed in an orderly, efficient manner.

Building setbacks are primarily enforced by means of the zoning ordinance, which is used to assist in the implementation of the circulation element of the plan, by requiring that new improvements be set back along roads that eventually will be widened. The ultimate road width required is mapped and subsequent improvements must be built behind future street lines. Substantial tax monies are saved because expensive improvements are not located in areas scheduled for future widening.

A tool which is used to implement both the land use and circulation elements is the subdivision ordinance, which sets minimum standards for the division of land into parcels for homes and other uses. These regulations are designed to insure that the future value of sites is not lessened because of unwise land division and design and construction of substandard streets and utilities which the community would subsequently be required to improve at the taxpayers' expense.

Public improvements are investments made by the cities in facilities which will benefit their residents. The plan relates these improvements to each other and to the area within which they are located.

The Air Pollution Control Board's San Joaquin Valley and Southeast Desert Implementation Plans have been developed to assure that the high quality of the air will be maintained.

These plans include detailed implementation procedures and

standards which should be utilized by all jurisdictions. The development of a community is never complete; it is a continuing process. If the plans are to be useful and effective, they must be continually maintained and kept up to date. The proposals of the plan, therefore, should not be interpreted as unchangeable, but rather as indicating future proposals which were developed at a given point in time. As new factors evolve and conditions unfold, the plan is to be reviewed and updated. This updating should be undertaken at least every three to five years.

Procedure

A community's commitment to the planning process is measured by its willingness to enact the legislation which will give legal effect to its plans. The foregoing sections of the plan deal with the roles and responsibilities of local and other agencies. In this section recommended action is presented that must be taken to fulfill those responsibilities. It presents firm actions that are to be accomplished by the City agencies responsible for the City programs and methods that will be used to accomplish their goals.

Action by City Departments

The conservation, development, and utilization program will continue to be developed in accordance with the priorities as follows:

1. Amend, or cause to be amended zoning ordinances which include provisions for land conservation.

    a. Seismic safety zones.

    b. Flood plain zones.

2. Develop, or cause to be developed, a Parks and Recreation and Housing Elements of the General Plan.

3. Update the Land Use Element of the General Plan.

4. Acquire real property that is essential for the preservation of natural, scenic highway, or historic values and that will become unavailable if not acquired.

5. Acquisition of real property and development of facilities for the provision of flood control and waste water disposal.

6. Waste water disposal should be coordinated with the major water users.

7. Acquire, protect, and preserve examples of natural and scenic landscape and significant evidence of history.

In order to accomplish this action program, the City will utilize limited general funds, donations of land, State and Federal grants and loans.

The City should file applications for matching State and Federal grant programs.

The City will continue to meet its responsibilities directly by administrating the local plans and development.

APPENDIX B

CITIZENS AND GOVERNMENT

The crucial part of a meaningful conservation element of the General Plan is the interaction of the citizens and the government. Citizens and government is a misleading phrase, as it gives the impression these are two separate entities. Although citizens are the government, there seems to be a distinction between citizens in public office and having local, state and federal government jobs, and those on the "outside" of the government structure. It is a problem of communication if this situation is more imagined than real, but it is a crucial problem of government responsiveness when this situation exists.

In general, it was found that many citizens are ill-informed about government, are unaware of where to go for help when they need it, do not know what various agencies do, or how they can make their opinions known. The result is a lack of citizen participation in local government. Those who participate do so only when they want something specific and then exert pressure to have policies established in their interest.

Problems or issues do not respect jurisdictional boundaries. A coordinated approach is needed and regional planning provides that -- a framework within which local governments coordinate their activities to provide solutions to problems that extend beyond their individual boundaries. Regional planning's most valuable asset is the resources it has at hand for applying problem--solving techniques to today's complex problems and for providing mechanism to prevent problems.

For conservation areas to be preserved, policies have to be established now that will allow growth to occur in an orderly manner with a minimum conflict. However, a comment frequently heard in this City is, "We don't know what is going to happen, so how can we establish policies now?" This is an attitude of the past that has allowed short-sightedness and narrow vision to develop, resulting in the misuse and eventual destruction of much of our environment and its natural resources. Since patterns of land use accrue from day to day decisions, it is imperative these decisions be made within the framework of long-range goals. By establishing policies now, the framework will be provided for achieving the goal of adequate open-space.

APPENDIX C

METHODS OF PRESERVING OPEN SPACE

Outlined below are some of the various methods of preserving open-space and conservation areas, listed in approximate order of effectiveness and permanency.

1. Acquisition in Fee

Full fee interest in land for open-space preservation may be acquired by purchase, through gifts, or by the process of eminent domain.

a. Purchase and use by a public jurisdiction.

b. Purchase--leaseback. Land is purchased by a public jurisdiction and leased back to the original owner or another party for uses compatible to open-space objectives under conditions that may be stipulated by the public body. Variations could allow, where appropriate, leases for specific lengths of time or in life estate to the original owner.

c. Purchase--saleback. Land is purchased by a public jurisdiction and resold to either the original owner or a third party with certain covenants or less certain rights, such as development rights.

2. Acquisition of Partial Interest

Interests that are less than the fee simple in land include easements, leases, rights-of-entry, covenants running with the land, and other "development rights", a term commonly used to indicate a broad range of less-than-fee interests. The purpose of the acquisition of development rights, rather than of the entire fee interest are to 1) lower the costs of acquisition, 2) keep the land on the tax rolls, 3) permit land to remain in productive use, and 4) retain efficiency of private management.

a. Development rights. The rights to develop the land to intensive uses are acquired by a public jurisdiction. The land and its use for other purposes remain in private ownership.

b. Scenic or conservation easements. The right of control land to a degree over and above what may be allowable through police powers is acquired by a public jurisdiction.

c. Where the Open Space Plan proposes to include utility rights-of-way and/or properties, permission for use will be by virtue of a grant of a license, upon reasonable terms and conditions, from the utility. Permitted uses of such properties will not be planned which would interfere in any way with the use of such land for utility purposes .

3. Legislative Policy and Practice

A wide assortment of tax inducements involving preferential assessments, tax exemptions, tax deferrals, and other devices are currently in use in several states. The method of tax inducement utilized in California is the Land Conservation Act (Williamson Act) of 1965, as amended. The use of tax inducements to date can best be looked upon as a temporary holding action for open-space, subsidized by urban taxpayers with no promise of permanent open-space for future use.

a. Tax concessions. Taxes on lands serving open-space needs are deferred or abolished in return for assurance that the land will be maintained in its open state.

b. Differential assessments. Lands are assessed for their productive value instead of potential uses, e.g. "highest and best use".

4. Regulatory Methods

The cities under their police powers can control the use that people make of their property. However, the Constitution prohibits governing bodies from depriving people of their property without due process of law. The dividing line between regulation and taking is imprecise. Regulatory schemes thus suffer the risk of being declared void as an unconstitutional taking of property. The regulatory schemes, be they zoning or taxation, also suffer from the fact that the restrictions are legislative and not incorporated into the legal title of the land. Thus they have little permanance and can be altered or abandoned at the discretion of the Legislature.

a. Zoning. The basic "use" and "density" designation, plus "scenic conservation" and "special regulation"--combining districts where appropriate.

b. Other statutes and ordinances concerned or related to conservation: health regulation, grading ordinances, pollution control laws, etc.

COST OF CONSERVATION

The high cost of acquiring land is usually considered one of the biggest barriers to perserving lands. While methods cheaper than full purchase of open-space are available, some of them, such as the purchase of development rights and easements, can also be costly. These methods, and those of zoning and the granting of tax benefits to preserve open-space, typically give the governing agency less control over the development. Only full acquisition can assure that 30 years in the future open-space will remain completely open.

Recent studies have suggested that in some cases the cost of retaining land as open-space may be less than the cost of development. Savings in utility and service costs may offset the cost of open-space acquisition.

METHOD OF FINANCING

Since both full acquisition and less-than-fee acquisition are likely to be quite costly, methods other than use of the property tax might be tapped:

1. Sale of Delinquent Property

   The county or cities could place all revenue from the excess and tax delinquent property into a special conservation, development and utilization fund.

2. User Fees and User Taxes

   For certain intensively developed facilities, user fees and taxes may pay for a portion of the development costs.

3. Leasing

4. Alternative Tax Sources

   a. Real Estate Transfer Tax. A real estate transfer tax, in the form of revenue stamps is charged when real estate changes hands. The current rate is $.55 per $500, charged to the seller. The tax rate is determined by the State. The cities in Kern County receive 1/2 of all revenues collected in the cities, with the remainder going to the County. All of the revenues collected in the unincorporated areas of the County remain in the County.

   b. Gasoline Tax. Portions of this fund may be used for landscaping along scenic highways.

5. Federal Funds

a. The Land and Water Conservation Fund is a primary source of Federal funds available for the purchase of open-space land on a 50/50 matching fund basis. The administering agency is the Bureau of Outdoor Recreation, Department of Interior. The fund is often seriously oversubscribed, so promptness of application is a must for early funding consideration.

b. Wildlife Restoration Fund. Administered by the State Wildlife Conservation Board, it provides funds for acquisition, development, and preservation of key wildlife areas.

c. Legacy of Parks Program. The Legacy of Parks Program consolidates the Department of Housing and Urban Development, Historic Preservation Program and the Open Space Land and Urban Beautification Program. The program provides matching grants to states and local public bodies for up to 50% of the cost for acquiring title or other interests in and developing open-space land; for acquiring, restoring or improving sites, structures or areas of historic or architectural significance; and for public environmental improvements which provide long-term benefits in urban areas. In addition, the program provides grants to states and local public bodies up to 75% of the cost for acquiring interest in undeveloped or predominantly undeveloped land which has significance in helping to shape economic and desirable patterns of urban growth. The objectives of the program include: to help curb urban sprawl and prevent the spread of urban blight and deterioriation, to encourage more economic and desirable urban development, to assist in preserving areas and properties of historic or architectural value, and to help provide necessary recreational, conservation, and scenic areas. There are innumerable other federal funds available which can be used for costs relating to open-space. Competition for grants is stiff, however, and while making every effort to obtain funds, the county and cities should not count on State and Federal programs for implementing its conservation program.

6. Private Funds

Private citizens and groups have set up non-profit land banks, or trusts, which are being used in various parts of this County to preserve open-space in perpetuity, without the chance of sale or misuse--something which can occur in City-controlled or owned land. These trusts can be set up to include many of the provisions offered in connection with City or County acquired rights.

APPENDIX D

OPEN SPACE ZONING

Zoning, as practiced to date, has not inspired public confidence as a means of restricting the use of open-space land. It has often been ignored by both prospective buyer and assessor. Hopefully, the legislative directive that zoning be consistent with the provisions of the General Plan will restore public confidence in zoning.

It is important to stress here that the proposed new zoning is not prompted by discrimination of any sort. There is clearly no basis for saying that the amendments constitute either snob zoning or exclusionary zoning. This City is not in the position of those municipalities which, through zoning, seek to restrict all but a very limited number of land uses and economic classes. Rather, this is a heterogenous community within which provision has been made for nearly every kind of use reasonably suited to an urban area. The inclusion of lands zoned for open-space use within the community will augment, rather than detract from the balance and variety of uses. Similarly, these land use restrictions are imposed with equal force upon a large number of landowners in a land area of considerable size, in a comprehensive manner, and allow a range of reasonable uses for all the property involved.

Zoning is never permanent; indeed, it cannot be for it must meet the changing needs and findings of the community. This is exactly what the City would be trying to do in enacting zoning consistent with the open-space element to the General Plan. One of the pressing needs of our times is for open-spaces and green areas. A community such as the City must take into account that the area affected by certain topographic features is not only unsuitable for intensive development in terms of environmental constraints, but is also the only significant amount of relatively undeveloped land in the City. It has now become distressingly clear that the impact of unsuitable development and overdevelopment, with its inevitable side effects, can cause irreparable damage to a community.

Zoning is, of course, by its very nature both exclusionary and discriminatory. It limits the free use of property and it affects property values. The rational for such limitations as enunciated by the courts is that the citizenry of a city has a legitimate interest in a rational and orderly developmental process for their municipal environment that overrides any specific private landholders interest in the absolutely free and unrestricted use of his land.

It is clear that where no vested rights exist, the power of government authority to zone is also the power to rezone. There is no "down zoning", "up zoning", or "back zoning", but only zoning to allow greater or lesser density, or more or less intensive use. Mere loss of economic value as a result of zoning or rezoning is not, and has not been, the controlling factor in determining the validity of such regulations. In California,the courts have held that the loss of value--short of precluding all use of land-- is, of itself, of no legal consideration at all. The essential questions are whether or not the zoning imposed is reasonable in context, and whether or not it is arbitrary in its application to the affected property. Certainly, where the police power has been exceeded and there has been either an actual taking--amounting to an easement--or a deprivation of all use of the property, there might be a compensable taking of land.

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